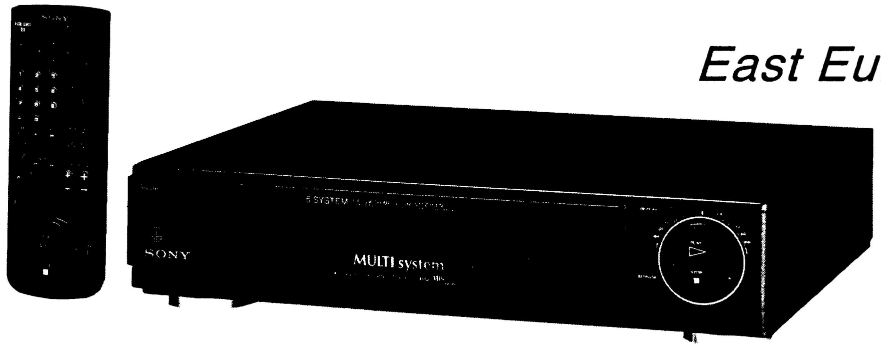
SLV-526MK/X700
RMT-V121

SERVICE MANUAL

E Model
Tourist Model
SLV-X700

East European Model
SLV-526MK



Remote commander RMT-V121 is available as a unit, but as individual parts the battery case lid of commander is only available.

Photo: SLV-X700

SPECIFICATIONS

System

Format	VHS standard
Video recording system	Rotary 2-head helical scanning system
Audio recording system	Monaural
Video signal	PAL/SECAM/MESECAM/NTSC3.58/ NTSC4.43
Tape speed	PAL/SECAM/MESECAM SP: 23.39 mm/sec. LP: 11.70 mm/sec. NTSC SP: 33.35 mm/sec. LP: 16.67 mm/sec. EP: 11.12 mm/sec.
Maximum recording time	PAL/MESECAM/SECAM SP: 240 minutes with E-240 LP: 480 minutes with E-240 NTSC SP: 180 minutes with T-180 EP: 540 minutes with T-180
Fast-forward and rewind time	Approx. 2 min. 30 sec. (with E-180)
Audio frequency response	80 Hz – 10 kHz
Distortion	Less than 3.5%
Wow and flutter	Less than 0.35%

Tuner Section

Tuner system	39-position voltage system tuner
Channel coverage	See page 10.
Antenna	75 ohm antenna terminal for VHF/UHF
RF converter output	UHF channel 30 to 39

Input and Output

Video	LINE IN VIDEO: phono jack 1.0 V ±0.5 V (p-p) 75 ohms, unbalanced, sync negative LINE OUT VIDEO: phono jack 1.0 V (p-p) ±0.2 V (p-p) 75 ohms, unbalanced, sync negative
Audio	LINE IN AUDIO: phono jack More than 50 kilohms, –8 dBs (0 dB = 0.775 V rms) LINE OUT AUDIO: phono jack Load impedance less than 10 kilohms, –8 dBs

Timer Section

Clock	Quartz locked
Time indication	24-hour indication
Timer setting	6 programs for 1 year max.
Power back up	Back-up duration: approx. 1 hour
Tape counter	Linear time counter

General

Power requirements	110 – 240 V AC, 50/60 Hz
Power consumption	23 W
Dimensions	430 × 100 × 362 mm (w/h/d) (17 × 4 × 13 3/8 inches) including projecting parts and controls
Weight	Approx. 5.7 kg (12 lb 5 oz)

—Continued on page 2—

VHS VIDEO CASSETTE RECORDER

MICROFILM

SONY®

Remote Commander

Remote control system	Infrared control
Power requirements	3 V DC, two R6 batteries
Dimensions	68 × 32 × 198 mm (w/h/d) (2 3/4 × 1 5/16 × 7 7/8 inches)
Weight	Approx. 150 g (3 oz) (not including batteries)

Accessories Supplied

Remote Commander with two R6 batteries	(1)
75-ohm coaxial cable with DIN type connector	(1)
AC plug adaptor (SLV-X700)	(1)
Antenna plug adaptor (NTSC connector → PAL connector) (Only for the VTR purchased in Japan)	(1)
Schematic diagram (SLV-526MK)	(1)

Design and specifications are subject to change without notice.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet.
Refer servicing to qualified personnel only.

Caution
Televison programs, films, video tapes and other materials may be copyrighted.
Unauthorized recording of such material may be contrary to the provisions of the copyright laws.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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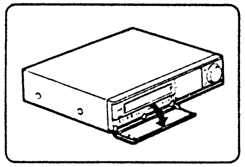
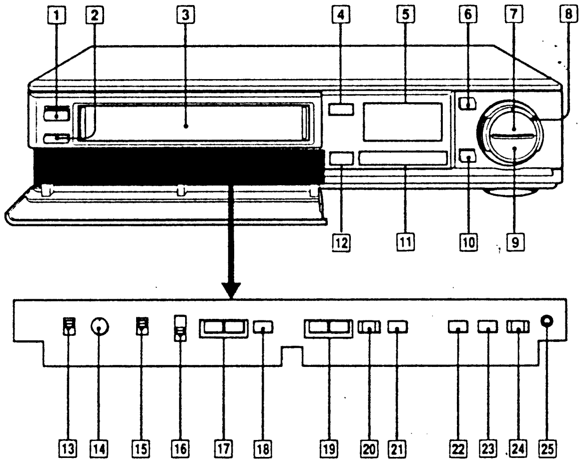
Labeling Parts and Controls

Refer to pages in circles for details.

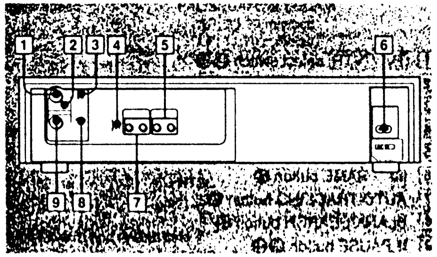
Front Panel





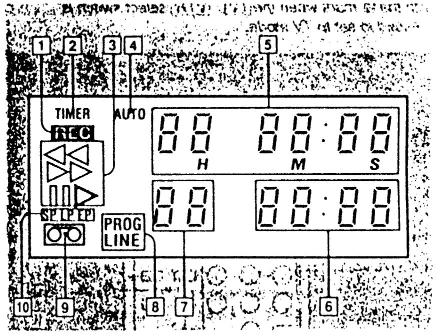
1 ON/STANDBY button and indicator
2 ⏏ EJECT button ⓭
3 Cassette compartment ⓭
4 AUTO TRACKING indicator ⓯
5 Display window
6 REPLAY button ㉑
7 ▷ PLAY button ⓭㉑
8 DUAL MODE SHUTTLE ring ⓮㉑
9 ■ STOP button ⓮
10 ❚❚ PAUSE button ㉑
11 COLOR SYSTEM indicators ⓫
12 Remote sensor ❺
13 RENTAL PICTURE ON/OFF switch ⓯
14 SHARPNESS control ⓯
15 COLOR SYSTEM SELECT (NTSC PB ON PAL TV) switch ⓬
16 COLOR SYSTEM SELECT (AUTO(PAL MESECAM)/SECAM/NTSC$_{3.58}$/ NTSC$_{4.43}$) switch ⓫
17 TRACKING NORM/SLOW and STILL ADJUST ▼/▲ buttons ⓯㉑
18 TRACKING AUTO/MANUAL button ⓯
19 PROGRAM +/– buttons ❾⓰㉔
20 TIMER REC ON/OFF button ⓲
21 QUICK TIMER button ㉔
22 INPUT SELECT button ❽⓰㉔
23 TAPE SPEED button ⓰㉔
24 ● REC button ⓰
25 CL (all clear) button ㉚

Rear Panel



1 AERIAL IN socket ❹
2 DX/LOCAL switch ❻
3 TEST SIG. (signal) switch ❻
4 TV SYSTEM select switch ⓫
5 LINE OUT AUDIO/VIDEO jacks ❹㉕
6 AC IN (inlet) ❹
7 LINE IN AUDIO/VIDEO jacks ㉕
8 RF CHANNEL selector ❻
9 AERIAL OUT connector ❹

Indications in the Display Window



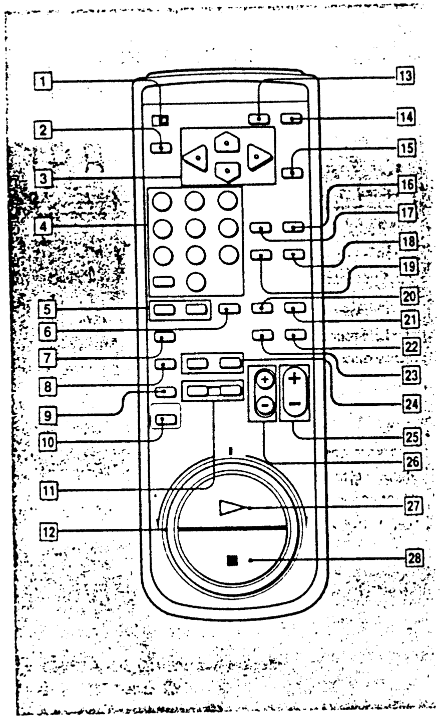
1 REC (recording) indicator
2 TIMER recording indicator
3 Tape operation indicator
4 AUTO indicator
5 Linear tape counter
6 Clock
7 Program position number
8 Input mode indicator
9 Cassette indicator
10 Tape speed indicator

SECTION 1
GENERAL

This section is extracted from SLV-X700 instruction manual.

Remote Commander

The buttons on the Commander with the same name or mark as those on the VTR have the same function. The buttons with a yellow dot can be used to remotely control Sony TVs with the ■ mark when the TV / VTR select switch is pressed to set to TV mode.



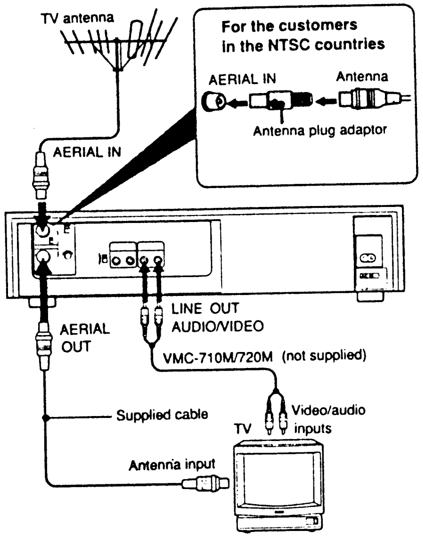
1 TV / VTR select switch ❺⓰
2 MENU button ❼❽⓱㉒
3 CURSOR ▲/▼/◀/▶ buttons ❼❽⓱㉒
4 Number buttons ⓰
5 ▮► SLOW +/- buttons ㉑
6 II▶ FRAME button ㉑
7 AUTO TRACKING button ⓯
8 BLANK SEARCH button ㉓
9 II PAUSE button ⓰㉑
10 REPLAY button ㉑
11 ● REC buttons ⓰
12 DUAL MODE SHUTTLE ring ⓳㉑
13 ▢ (power-on) button (only for TV)
14 ⏻ (on/standby) button ⓳
functions as power-on or standby button when TV / VTR is set to VTR , and as standby button when TV / VTR is set to TV .
15 EXECUTE button ❼❽⓱㉒
16 TIMER REC ON/OFF button ⓲
17 TIMER REC CLEAR button ⓴
18 INPUT SELECT button ❽⓰㉔
19 QTR (quick timer recording) REC TIME button ㉔
20 COUNTER RESET button ⓯⓰
21 TAPE SPEED button ⓰㉔
22 TV/VIDEO button
23 DATA SCREEN button ⓯⓰
24 ⊖ / ⊕ SEARCH buttons ㉑
25 VOL (volume) +/- buttons
26 PROG (program) +/- buttons ❾⓰㉔
27 ▷ PLAY button ⓭㉑
28 ■ STOP button ⓯

Connections

Turn all the power off before making connections.
Connect the AC power cord last.

Connecting an Antenna and a TV

Whenever you view video pictures as well as TV program on your TV screen, connect an antenna and a TV as shown.



For the customers in the NTSC countries

1. Disconnect the antenna from the antenna input terminal of the TV, and connect the antenna to AERIAL IN of this VTR.

   Note
   If you use your VTR in the NTSC system countries, attach an antenna plug adaptor (NTSC connector → PAL connector) to AERIAL IN. For the antenna plug adaptor, consult your Sony service facility.

2. Connect AERIAL OUT of this VTR to the aerial input terminal of the TV, using the supplied antenna cable.

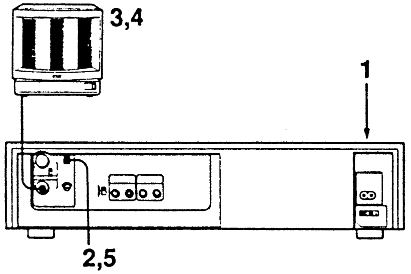
   Notes
   - If you use the antenna plug adaptor in step 1, connect LINE OUT AUDIO/VIDEO to the audio/video input jacks of the TV instead of a connection using the aerial sockets.
   - Connect the plug firmly to avoid picture distortion.

When your TV is equipped with the video/audio input jacks

In addition to the antenna connection, connect them to LINE OUT AUDIO/VIDEO of the VTR using the VMC-710M/720M cable (not supplied). In this way, you can get a higher quality picture.

Adjusting the TV

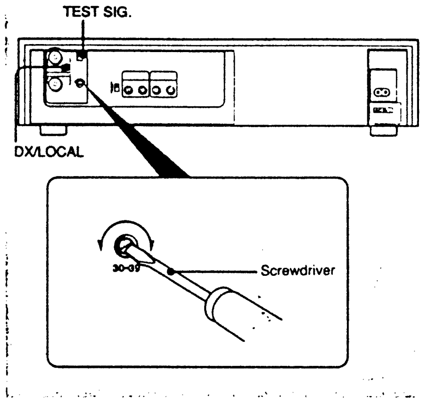
If you have connected your VTR and TV using only the aerial sockets, you have to adjust one of the television program positions to receive the VTR's signals.
If the TV-VTR connection is made using the video/audio jacks, skip this step.



1. Press ON/STANDBY to turn on the VTR.
2. Set TEST SIG. to ON.
   The test signal is transmitted on a channel between UHF channels 30 and 39.
3. Turn on the TV and select a program position that is not used to receive a TV station.
4. Tune the TV so that a test pattern is clearly displayed on the TV screen.
5. Set TEST SIG. to OFF.

Now you have tuned your TV to receive the VTR's playback picture. When you play back a tape, select the same program position you select in step 3 on the TV.

When the test pattern is not free of disturbance


TEST SIG.
DX/LOCAL
30-39
Screwdriver

1. Set TEST SIG. to OFF.
2. Adjust a program position on the TV between UHF channels 30 and 39, where the TV shows no picture and where no sound is heard.

   Note
   When you use your VTR in the PAL (D/K) or NTSC system country, adjust a program position between the UHF channels given in the list under "ADJUSTABLE" on page 12.
3. Set TEST SIG. to ON.
4. Turn RF CHANNEL slowly with a commercially available screwdriver until an undistorted test pattern is displayed on the TV screen.

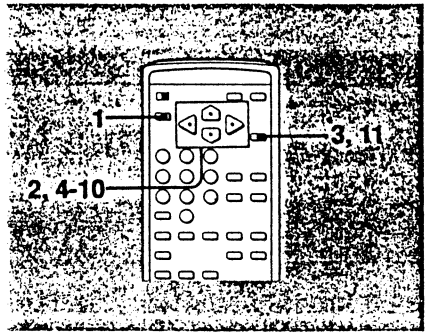
   Note
   In the PAL (D/K) or NTSC system country, adjustable range of the RF CHANNEL screw is between the channels listed on page 12.
5. Set TEST SIG. to OFF.

If the TV signal is too strong
Set the DX/LOCAL switch to LOCAL. Normally, set this switch to DX.

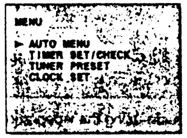
Setting Date and Clock

Set the clock to the current time and date.
You can set them by calling up the menu on the TV screen.

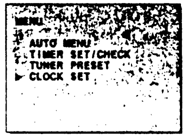
Example:
Sets the date and clock to 15:32, December 10, 1992.
Note that ▲ and ▼, used in the following procedure, move the cursor (▶ mark) or change the number, and ◀ and ▶ change the blinking item.



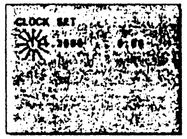
1. Press MENU.


MENU
▶ AUTO MENU
TIMER SET/CHECK
TUNER PRESET
CLOCK SET

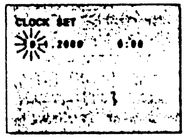
2. Press ▲ or ▼ to move the cursor to CLOCK SET.


MENU
AUTO MENU
TIMER SET/CHECK
TUNER PRESET
▶ CLOCK SET

3. Press EXECUTE.
   The CLOCK SET menu appears.


CLOCK SET
.2000

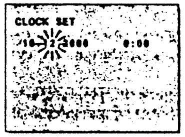
4. Press ▲ or ▼ until "10" appears in the day section.


CLOCK SET
.2000
0:00

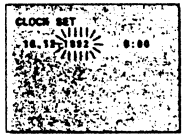
5. Press ▶ to make the next item (month) blink.

CLOCK SET
10 1 2000
0:00

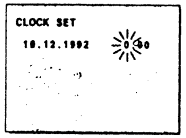
6. Press ▲ or ▼ until "12" appears.


CLOCK SET
10 2 2000
0:00

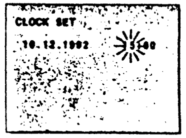
7. Press ▶ to make the next item (year) blink and press ▲ or ▼ until "1992" appears.


CLOCK SET
10.12 1992
0:00

8. Press ▶ to make the next item (hour) blink.

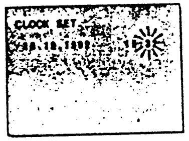

CLOCK SET
10.12.1992
0 00

9. Press ▲ or ▼ until "15" appears.


CLOCK SET
10.12.1992

Setting Date and Clock

10. Press ► to make the next item (minute) blink and press ▲ or ▼ until "32" appears.



```
CLOCK SET
```

11. Press EXECUTE simultaneously with a time signal. The clock will be set to 15:32:00. The CLOCK SET menu disappears.

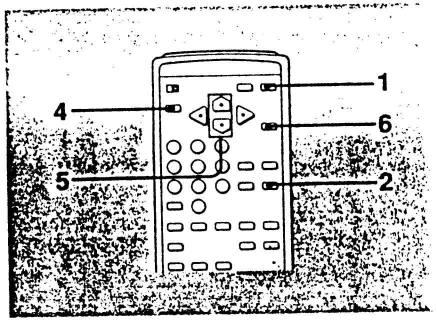
To recall the date and clock on the TV screen
Select CLOCK SET in the main MENU and press EXECUTE.

Note
You can set the clock except during timer recording, timer recording standby or quick timer recording.

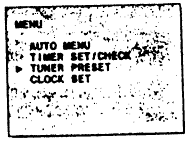
Presetting the Active Channels

To watch and record a TV program on the VTR, you have to preset channels. For presetting channels, call up the menu on the TV screen, then allocate the channels in your desired order.

Calling up the TUNER PRESET Menu

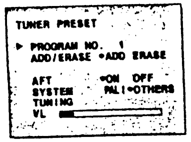


1. Press ⏻ (on/standby) to turn on the VTR.
2. Press INPUT SELECT to display the PROG indicator in the display window.
3. Turn on the TV. If you have made a VTR-TV connection using the aerial sockets, select the program position for video playback. (see page 6).
   If a VTR-TV connection is made using the video/audio jacks, select the input for VTR on the TV.
4. Press MENU.
   The main MENU appears on the TV screen.
5. Press ▲ or ▼ to move the cursor (► mark) to TUNER PRESET.



```
MENU

  AUTO MENU
  TIMER SET/CHECK
► TUNER PRESET
  CLOCK SET
```

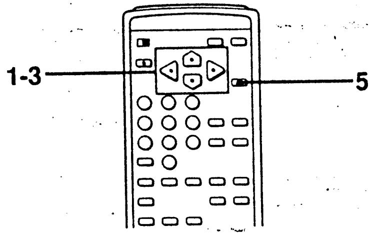
6. Press EXECUTE.
   The TUNER PRESET menu appears.



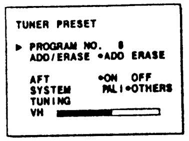
```
TUNER PRESET

► PROGRAM NO.  1
  ADD/ERASE •ADD ERASE

  AFT        •ON  OFF
  SYSTEM      PAL I•OTHERS
  TUNING
  VL
```

Allocating Desired Channels

Tune a desired TV channel to any desired program position.

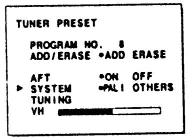


1. Press ◄ (to decrease number) or ► (to increase number) to select the desired program position.
   You can also use PROG +/– (or PROGRAM +/–).



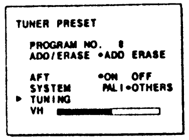
```
TUNER PRESET

► PROGRAM NO.  8
  ADD/ERASE •ADD ERASE

  AFT        •ON  OFF
  SYSTEM      PAL I•OTHERS
  TUNING
  VH
```

2. If you receive the broadcast based on the PAL I system, press ▲ or ▼ to move the cursor to SYSTEM, and move the dot to PAL I with ◄ or ►.
   To receive the broadcast based on other color systems, move the dot to OTHERS.



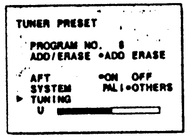
```
TUNER PRESET

  PROGRAM NO.  8
  ADD/ERASE •ADD ERASE

  AFT        •ON  OFF
► SYSTEM     •PAL I OTHERS
  TUNING
  VH
```

3. Press ▲ or ▼ to move the cursor to TUNING.



```
TUNER PRESET

  PROGRAM NO.  8
  ADD/ERASE •ADD ERASE

  AFT        •ON  OFF
  SYSTEM      PAL I•OTHERS
► TUNING
  VH
```

4. Press ► (or ◄) to scan the channel.
   Press ► for higher channel numbers, and press ◄ for lower channel numbers.
   When the first channel is received, the picture of that channel appears for about 5 seconds, and then the TUNER PRESET menu reappears.
   If you wish to allocate other channel, press ◄ or ► until the picture of that channel appears.



```
TUNER PRESET

  PROGRAM NO.  8
  ADD/ERASE •ADD ERASE

  AFT        •ON  OFF
  SYSTEM      PAL I•OTHERS
► TUNING
   U
```

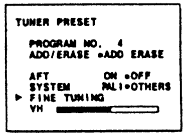
Channel scanning order on the VTR
The channel scans as follows according to the direction of the arrow.

VL (VHF low) ⇄ VH (VHF high) ⇄ U (UHF)

5. Repeat the above steps to allocate other channels to other program positions.
6. Press EXECUTE to store all the allocations.
   The display returns to the original screen.

When you cannot get fine tuning on a particular channel

1. Call up the TUNER PRESET menu on the TV screen. (See "Calling up the TUNER PRESET Menu".)
2. Press PROG +/- to select the program position to be fine-tuned.
3. Press ▲ or ▼ to move the cursor to AFT (Auto Fine Tuning) and move the dot (• mark) to OFF using ▶. "FINE TUNING" will appear.
4. Press ▲ or ▼ to move the cursor to FINE TUNING. The picture that has been automatically fine-tuned will appear for a few seconds.

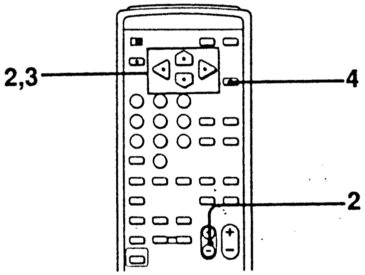


```
TUNER PRESET

  PROGRAM NO.   4
  ADD/ERASE •ADD ERASE

  AFT          ON •OFF
  SYSTEM      PAL I•OTHERS
▶ FINE TUNING
  VH
```

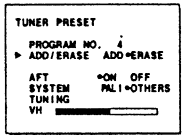
5. Press ◀ or ▶ until you can get the best picture.
6. Press EXECUTE to store the program position. The TUNER PRESET menu will disappear.

Erasing Unwanted Program Positions

You can preset the channels so that only the desired program positions appear when you press PROG +/– (or PROGRAM +/–).



1. Call up the TUNER PRESET menu on the TV screen. (See "Calling up the TUNER PRESET Menu".)
2. Press PROG +/– to call up the unwanted program position.
   You can also use ◀ or ▶ instead of PROG +/–.
3. Press ▲ or ▼ to move the cursor to ADD/ERASE, and select ERASE using ▶.

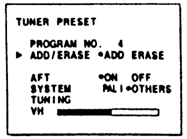


```
TUNER PRESET

  PROGRAM NO.   4
▶ ADD/ERASE   ADD•ERASE

  AFT         •ON   OFF
  SYSTEM      PAL I•OTHERS
  TUNING
  VH
```

   Repeat the above steps 2 and 3 to erase others, if you want.
4. Press EXECUTE.
   The original TV screen appears.

To enter the erased program position again

Select ADD instead of ERASE in step 3 above.



```
TUNER PRESET

  PROGRAM NO.   4
▶ ADD/ERASE •ADD ERASE

  AFT         •ON   OFF
  SYSTEM      PAL I•OTHERS
  TUNING
  VH
```

Setting the Color System

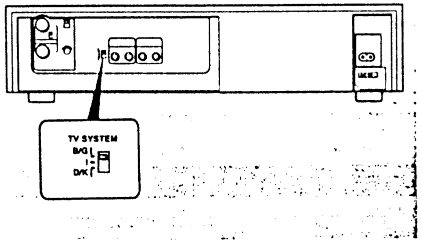
This VTR is designed to record and play back using the PAL (B/G, I, D/K), SECAM (B/G, D/K, K1) and NTSC (M) systems. Before you begin recording, you need to set TV SYSTEM and COLOR SYSTEM SELECT, and for playback you need to set COLOR SYSTEM SELECT.

Before Recording

The VTR receives TV programs based on the PAL (B/G, I, D/K), SECAM (B/G, D/K, K1) and NTSC (M) systems and records using these systems. The VTR also records the signals of the PAL, SECAM, MESECAM, NTSC$_{3.58}$ and NTSC$_{4.43}$ systems input from the LINE IN connectors. To record the programs, you need to set TV SYSTEM and COLOR SYSTEM SELECT according to the system to be recorded.

Setting the TV system

Set TV SYSTEM according to the TV system in your area.



B/G : For TV programs based on the PAL B/G or SECAM B/G system

I : For TV programs based on the PAL I system

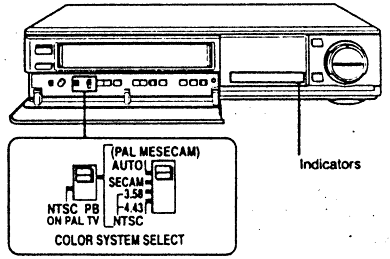
D/K : For TV programs based on the PAL D/K or SECAM D/K system

Notes

- There is no need to set TV SYSTEM for NTSC system.
- If you do not know the TV system used, set TV SYSTEM to the position at which audio can be heard. Normal audio cannot be heard if TV SYSTEM is set to the incorrect position.

Setting the color system

Set COLOR SYSTEM SELECT (AUTO/SECAM/NTSC $_{3.58}$ /NTSC $_{4.43}$) according to the color system of the program to be recorded. The indicator of the selected system lights.



AUTO : To record TV programs based on the PAL or SECAM system
The PAL or MESECAM color signal is automatically selected.

SECAM : To record a video signal based on the SECAM system

NTSC$_{3.58}$: To record TV programs based on the NTSC$_{3.58}$ system

NTSC$_{4.43}$: To record a video signal based on the NTSC$_{4.43}$ system

Notes

- Normally, set COLOR SYSTEM SELECT (NTSC PB ON PAL TV) to the upper (AUTO) position. Set the switch to the lower position only when playing back the tape recorded in the NTSC system on a PAL TV.
- When the position of the COLOR SYSTEM SELECT switches is set to SECAM, NTSC$_{4.43}$ or NTSC PB ON PAL TV, the MENU displays are shown on the gray back color.

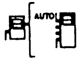
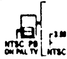
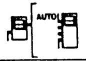
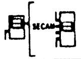
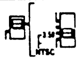
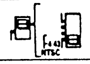
Channel coverage

SYSTEM	AREA	RECEIVING CHANNELS			OUTPUT SETTING BY RF CHANNEL SCREW	
		VL	VH	U	PRESET	ADJUSTABLE
PAL B/G	Western Europe	2 — 4 X — Z S1, S2	S3 — S10 5 — 12 S11 — S20	21 — 69	36	30 — 39
	Turkey, Kuwait, U.A.E., Oman, Jordan	2 — 4	5 — 12	21 — 69		
	Australia	0 — 5	5A — 11	28 — 69		
	Indonesia	2, 3	4 — 11	21 — 69		
PAL I	United Kingdom, Hong Kong	—	—	21 — 69	36	30 — 39
	Ireland	A — C, S1, S2	D — G, H, J S3 — S20	21 — 69		
	South Africa	—	4 — 11, 13	21 — 69		
PAL D/K	China	1 — 5	6 — 12	13 — 56	24 — 25	22 — 26
SECAM B/G	Saudi Arabia, Iran, Iraq, Libya, Egypt, Morocco, Greece, Syria	2 — 4	5 — 12	21 — 69	36	30 — 39
SECAM D/K	East Europe, Former Soviet Union	1 — 5	6 — 12	21 — 69	36	30 — 39
SECAM K1	Zaire, Senegal, Niger, New Caledonia, Tahiti, The Guiana	—	K4 — K9	—	36	30 — 39
NTSC 3.58	USA	2 — 6 A-8 — A-6, A-5 — A-2	7 — 13 A — W	14 — 78	34	26 — 38
	Japan	1 — 3	4 — 12	13 — 62	33	25 — 37

Before Playback

You need to set COLOR SYSTEM SELECT according to the tape to be played back and the TV to be used. Set COLOR SYSTEM SELECT (AUTO/SECAM/NTSC 3.58 /NTSC 4.43) and COLOR SYSTEM SELECT (NTSC PB ON PAL TV) as indicated in the following list.

– : The playback picture cannot be viewed.

TV to be used	**Tape to be played back**			
	PAL	**MESECAM**	**SECAM**	**NTSC**
PAL		—	—	
SECAM	—			—
NTSC 3.58	—	—	—	
NTSC 4.43	—	—	—	

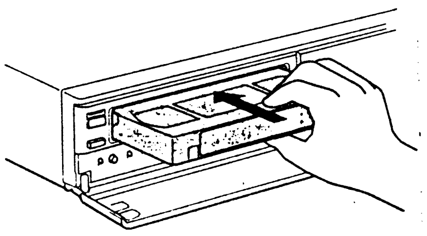
Notes

- When playing back tapes recorded with the NTSC3.58 and NTSC4.43 systems, the picture may be shrunk vertically or may not appear on the screen depending on the TV used.
- If your TV does not conform to the color system of the program to be recorded or the tape to be played back, you cannot view the program to be recorded or played back.

Playback

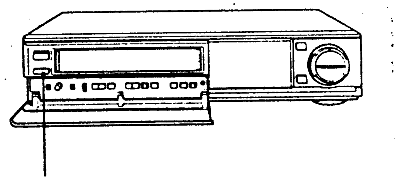
This section shows you how to insert a video cassette into the VTR and to play it back.

Loading a Video Cassette



Insert the cassette into the cassette compartment by gently pressing the center of the back of the cassette with the arrow on the top.
When the cassette is loaded, the VTR automatically turns on.
If the loaded cassette has its safety tab removed (see "Protecting your cassette from being erased"), the playback starts automatically.

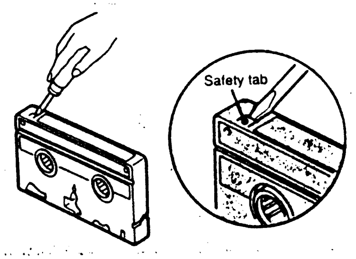
Ejecting the video cassette



Press ⏏ EJECT on the VTR.
You can eject the cassette even when the power is off.
When you press ⏏ EJECT, the VTR turns on automatically.
After ejecting the cassette, the VTR turns off again.

Protecting your cassette from being erased

The cassette is provided with a safety tab. To avoid accidental erasure, remove the safety tab using a screwdriver or a similar tool as shown.



If you want to record again on the cassette without its safety tab, simply cover the safety tab hole with a piece of plastic tape.

Selecting the Recording Mode

Press TAPE SPEED to select the recording time (tape speed) before recording. During playback, the VTR automatically detects the tape speed and plays back in that mode.
The chart below shows the recording/playback time available in each mode.

PAL, MESECAM, SECAM

Cassette tape	TAPE SPEED setting	
	SP mode	LP mode
E-30	30 min.	1 hr.
E-60	1 hr.	2 hrs.
E-90	1 hr. 30 min.	3 hrs.
E-120	2 hrs.	4 hrs.
E-150	2 hrs. 30 min.	5 hrs.
E-180	3 hrs.	6 hrs.
E-195	3 hrs. 15 min.	6 hrs. 30 min.
E-210	3 hrs. 30 min.	7 hrs.
E-240	4 hrs.	8 hrs.

NTSC

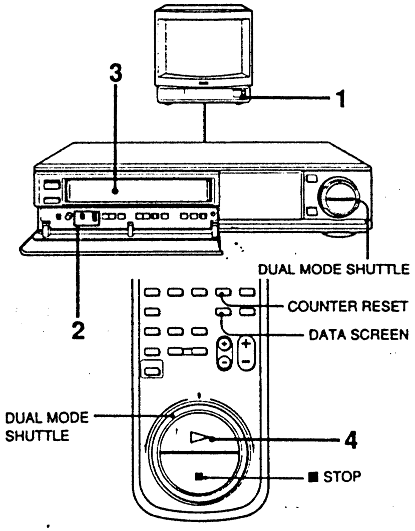
Cassette tape	TAPE SPEED setting	
	SP mode	EP mode
T-30	30 min.	1 hr. 30 min.
T-60	1 hr.	3 hrs.
T-120	2 hrs.	6 hrs.
T-160	2 hrs. 40 min.	8 hrs.
T-180	3 hrs.	9 hrs.

Notes
- In the SP mode, the tape runs twice as fast as in the LP mode, and three times as fast as in the EP mode.
- When the PAL format cassette is used for the NTSC system recording, the actual recording time is shorter than the standard recording time stipulated on the cassette.

Auto head cleaner
The VTR incorporates the auto head cleaner and cleans the video heads when a cassette is loaded or unloaded. When the effect is not sufficient even after a cassette has been loaded/unloaded several times, use the Sony T-25CL video head cleaning cassette.

Playing Back the Cassette

Before playing back the cassette, check that all the connections are made correctly.



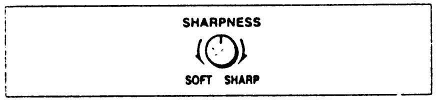
1. Turn on the TV. If you have made a VTR-TV connection using the aerial sockets, select the program position for video playback.
   If you have made it using the video/audio jacks, select the input for the VTR.
2. Set COLOR SYSTEM SELECT to the appropriate position according to a tape to be played back or the TV to be used. (See page 12.)
3. Insert a cassette.
   The VTR turns on automatically. If the safety tab of the cassette is removed, playback also starts automatically.
4. Press ▷ PLAY (the upper half of the DUAL MODE SHUTTLE ring).
   Playback starts.
   When the tape reaches to the end, the VTR automatically rewinds the tape to the beginning (auto rewind). The power of the unit remains on.

To stop playback
Press ■ STOP (the lower half of the DUAL MODE SHUTTLE ring).

To rapidly advance the tape
Press ■ STOP, then turn the DUAL MODE SHUTTLE ring on the VTR or on the Commander clockwise (▶▶).

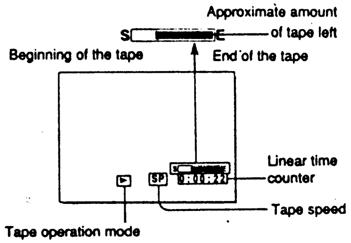
To rewind the tape
Press ■ STOP, then turn the DUAL MODE SHUTTLE ring counterclockwise (◀◀).

To adjust the sharpness of the picture
Turn the SHARPNESS control on the VTR to SHARP for a sharper picture or to SOFT for a softer picture.



Playing back a rental video
Set the RENTAL PICTURE ON/OFF switch on the VTR to ON. Noise will be reduced on the playback picture. After playing it back, set the switch to OFF.

Data screen information
The following information (data screen) appears on the TV screen. The remaining tape length indicator helps you to know the approximate amount of the tape left.



To erase the data screen information or to display it again
Press DATA SCREEN on the Commander.

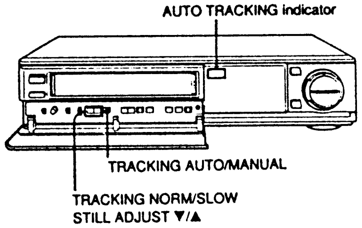
Notes on the remaining tape length indicator
- The remaining tape length indicator only shows the approximate amount of tape left.
- It may not operate properly when a short tape, such as E-30, or non-standardized tape is loaded.
- The data screen is not displayed during still mode or slow motion playback.

Resetting the linear time counter
The linear time counter on the data screen and in the display window indicates the approximate running time of the tape. It helps you to locate a certain scene after playback. Press COUNTER RESET on the Commander to set the counter to the counter zero position ("0:00:00" on the data screen and "0H00M00S" in the display window) before playing back the tape (the tape counter is automatically reset to zero whenever a cassette is inserted). The VTR will keep counting the length of the tape being played back.
Note, however, that the time counter will not count the portions without video signals recorded.

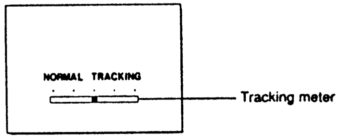
Adjusting Picture Manually

The tracking condition is automatically adjusted on this VTR. The AUTO TRACKING indicator blinks while the VTR is searching for the best tracking condition and lights when optimum playback picture is obtained. The automatic tracking control is activated in the following conditions:
- when you load a cassette.
- when the tracking condition is poor while playing back a tape.
- when you press TRACKING AUTO/MANUAL after the picture is adjusted manually.

However, if streaks or snow noise appear on the picture, adjust the tracking condition as follows:



Press TRACKING NORM/SLOW and STILL ADJUST ▼/▲ to obtain the best possible picture.
The tracking meter appears on the TV screen and the AUTO TRACKING indicator goes off.



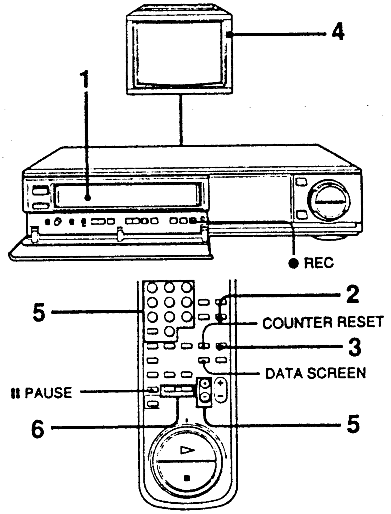
To return to the auto tracking adjustment
Press TRACKING AUTO/MANUAL on the VTR or AUTO TRACKING on the Commander.

Notes on manual tracking adjustment
- Tracking adjustment may not be possible when the tape is recorded in LP mode or the recording condition of the tape is very poor.
- The tracking meter will not appear if the data screen information is erased by pressing DATA SCREEN on the Commander.

Recording

This section shows you how to record TV programs. You can also watch a TV program on the TV screen while recording another.
Before recording, check to see that all the connections have been made correctly and that the COLOR SYSTEM SELECT and TV SYSTEM settings have been made correctly (see page 11).

Recording TV Programs



1. Insert a cassette.
   The VTR automatically turns on. The 📼 indicator appears.

2. Press INPUT SELECT to light PROG in the display window of the VTR.

3. Press TAPE SPEED to select the recording speed. (SP or LP for the PAL, MESECAM and SECAM systems, SP or EP for the NTSC system)

4. Turn on the TV. If you have made a VTR-TV connection using the aerial socket, select the program position for video playback. If you have made it using the video/audio jacks, select the input for the VTR.

5. Select the program position you want to record with PROG +/– or number buttons.
   To select the program number over 9 with the number buttons, press -/- - first and then the ten's digit and the unit's digit.

6. Press ● REC while pressing the recording auxiliary button.
   Recording starts and REC indicator lights.
   You can also start recording by pressing ● REC on the VTR.
   When the tape reaches the end, the VTR automatically rewinds the tape.

About the data screen information

The data screen information appears on the TV screen. Press DATA SCREEN on the Commander to erase it or to display it again.
The data screen information will not be recorded on the tape.

Notes on the remaining tape length indicator
- The remaining tape length indicator only shows the approximate amount of tape left.
- It may not operate properly when a short tape, such as E-30, or non-standardized tape is loaded.

If you want to operate the TV using the Commander
Set the TV/VTR selector to TV. You can select the TV channel with PROG +/–, select the input for the VTR with TV/VIDEO, and adjust the volume with VOL +/–.

To stop recording
Press ■ STOP (the lower half of the DUAL MODE SHUTTLE ring).

To stop the tape momentarily during recording

Press II PAUSE.
To resume recording, press II PAUSE again.
You can cut out the unwanted scene during recording using this button.
1. Press II PAUSE when an unwanted scene appears on the screen. Recording pauses.
2. Press II PAUSE again to resume recording at the desired scene.

Resetting the linear time counter

The linear time counter on the data screen and in the display window indicates the approximate running time of the tape. It helps you to locate a certain scene after recording. Press COUNTER RESET on the Commander to set the counter to the counter zero position ("0:00:00" on the data screen and "0H00M00S" in the display window) before recording the tape (the tape counter is automatically reset to zero whenever a cassette is inserted). The VTR will keep counting the length of the tape being recorded.
Note, however, that the time counter will not count the portions without video signals recorded.

Watching a TV program while recording another

Select the program position of the TV program you desire on the TV.

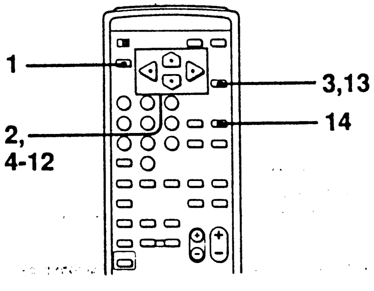
Timer-Activated Recording

You can preset up to six TV programs within one year (between today and one day before the same day in the next year).
This section shows you how to preset, on the timer of the VTR, the recording turn-on and turn-off time for the TV programs to be recorded. You can also check and change the timer settings if you want.

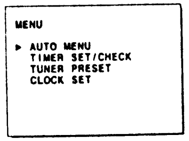
Setting the Timer

To assure your presetting, check the followings before setting the timer:
- You have turned on the TV and selected the program position for video playback or the input for the VTR.
- The date and clock show the present time (see "Setting Date and Clock").
- The cassette with its safety tab is loaded in the VTR.

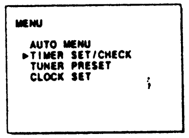
Example:
Records the TV program broadcast from 21:00 to 22:55 on 8th November, on program position 8 in SP mode.



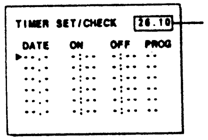
1. Press MENU. The main MENU appears on the TV screen.



2. Press ▲ or ▼ to move the cursor (▶ mark) to TIMER SET/CHECK.

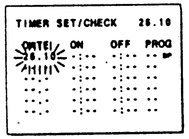


3. Press EXECUTE.
   The TIMER SET/CHECK menu appears.

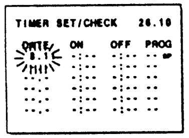


Current date

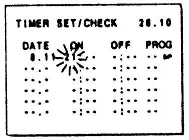
4. Press ▶.
   Today's date blinks. If the date is not correct, reset the clock. You can set the blinking item.



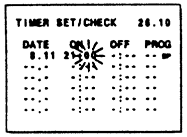
5. Press ▼ or ▲ until "8.11" appears.



6. Press ▶ to blink the turn-on hour section under ON, and then press ▲ or ▼ until "21" appears.

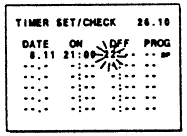


7. Press ▶ to blink the turn-on minute section, and then press ▲ or ▼ until "00" appears.



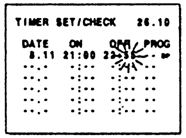
```
TIMER SET/CHECK   26.10
 DATE   ON    OFF   PROG
 8.11 21:00 --:--  -- SP
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
```

8. Press ▶ to blink the turn-off hour section under OFF, and then press ▲ or ▼ until "22" appears.



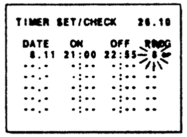
```
TIMER SET/CHECK   26.10
 DATE   ON    OFF   PROG
 8.11 21:00 22:--  -- SP
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
```

9. Press ▶ to blink the turn-off minute section, and press ▲ or ▼ until "55" appears.



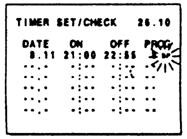
```
TIMER SET/CHECK   26.10
 DATE   ON    OFF   PROG
 8.11 21:00 22:55  -- SP
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
```

10. Press ▶ to blink the program position section under PROG, and then press ▲ or ▼ until "8" appears.
If you record the input source from the LINE IN jacks, press INPUT SELECT to display LINE.



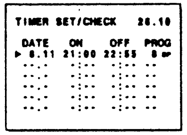
```
TIMER SET/CHECK   26.10
 DATE   ON    OFF   PROG
 8.11 21:00 22:55   8 SP
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
```

11. Press ▶ to blink the recording speed section, and then press ▲ or ▼ until the desired tape speed appears.



```
TIMER SET/CHECK   26.10
 DATE   ON    OFF   PROG
 8.11 21:00 22:55   8 SP
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
```

12. Press ▶.
All the items stop blinking and the cursor (▶ mark) appears showing that all the necessary items are entered.



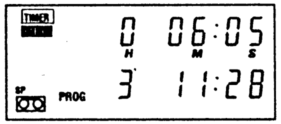
```
TIMER SET/CHECK   26.10
 DATE   ON    OFF   PROG
▶ 8.11 21:00 22:55  8 SP
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
 --.-- --:-- --:--  --
```

13. Press EXECUTE.

Note
The TIMER indicator blinks if the turn-on time is within 5 minutes.

14. Press TIMER REC ON/OFF.
The VTR turns off and enters the timer recording standby mode. The TIMER indicator appears in the display window.

The VTR automatically turns on, starts recording at the selected time, and turns off after recording ends.
During timer recording, the TIMER and REC indicators light in the display window.



To change the setting before completing it
Press ◀ or ▶ to return to the item to be changed and then correct the item.

To preset other TV programs successively before pressing TIMER REC ON/OFF
Press ▼ or ▲ to move the cursor to the next line and repeat steps 4 to 13.

To stop timer recording
Press TIMER REC ON/OFF.

If the cassette is ejected after pressing TIMER REC ON/OFF
The safety tab of the inserted cassette has been removed.

If the TIMER indicator does not appear
No cassette has been inserted or the tape is at its end.

A warning beep sounds in the following cases:

- If you press TIMER REC ON/OFF when
  - — no program is set for timer recording
  - — the inserted tape is at its end
  - — the safety tab of the inserted tape has been removed
  - — no cassette is inserted
- If you try to set for timer recording during timer recording
- If you try to reset the clock during timer recording
- If you try to set for timer recording while the clock has not been set

If the power is interrupted while in the timer recording standby/timer recording mode for more than one hour
In the recording standby mode, timer settings are cleared. Reset the settings from the beginning.
In the timer recording mode, the recording stops and the VTR turns off.
If the power interruption lasts for less than one hour, the VTR returns to the original mode when the power is recovered.

Using the VTR before timer-activated recording starts

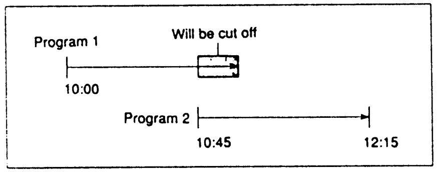
Press TIMER REC ON/OFF so that the TIMER indicator in the display window is turned off, then turn on the power of the VTR.
After using the VTR, be sure to press TIMER REC ON/OFF to display the TIMER indicator.

Daily recording

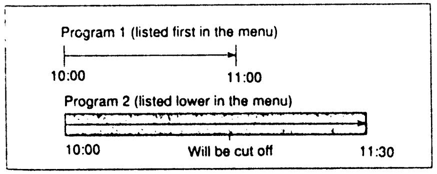
You can preset to record the same program each day of the week. Press ▼ until "EVERY" appears in step 5 of "Setting the Timer" on page 17.

When the timer settings overlap or coincide

■ If the setting of two programs overlaps
The recording of the following program will begin automatically before the preceding program ends as shown.



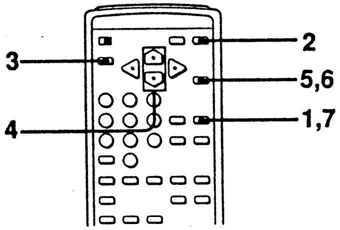
■ If the turn-on time of two programs is the same
The VTR will record the program listed first in the TIMER SET/CHECK menu. The program listed lower in the menu will not be recorded.


Program 1 (listed first in the menu)
10:00
11:00
Program 2 (listed lower in the menu)
10:00
Will be cut off
11:30

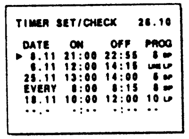
■ If the turn-off time of program 1 and the turn-on time of program 2 are the same
The recording of two programs will be correctly made.

Checking the Timer Settings

You can check the current timer settings, while in the timer standby mode, by displaying the TIMER SET/CHECK menu on the screen.



1. Press TIMER REC ON/OFF to turn off the TIMER indicator in the display window.
2. Turn on the VTR.
3. Press MENU to display the main MENU.
4. Press ▲ or ▼ to move the cursor to TIMER SET/CHECK.
5. Press EXECUTE.
The TIMER SET/CHECK menu appears.
You can now check the contents of the current timer settings.



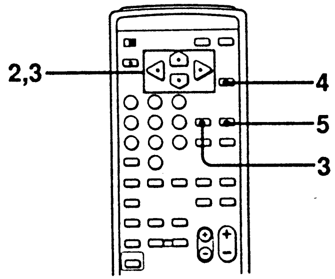
```
TIMER SET/CHECK   26.10
 DATE   ON    OFF   PROG
▶ 8.11 21:00 22:55   8 SP
  6.11 12:00 14:15 LINE LP
 25.11 13:00 14:00   6 SP
 EVERY  8:00  8:15   8 SP
 18.11 10:00 12:00  10 LP
 --.-- --:-- --:--  --
```

6. Press EXECUTE.
The original screen appears.
7. Press TIMER REC ON/OFF.
The VTR re-enters the timer recording standby mode.

To check the timer settings during timer recording
Follow steps 3 to 6.

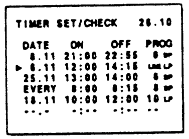
Changing or Erasing the Timer Settings

You can change or erase the timer settings while checking the TIMER SET/CHECK menu on the screen.



1. Display the TIMER SET/CHECK menu on the TV screen. (See steps 1 to 4 of "Checking the Timer Settings".)

2. Press ▲ or ▼ to move the cursor to the setting you want to change or erase.



```
TIMER SET/CHECK    26.10

 DATE    ON     OFF   PROG
  8.11  21:00  22:55   8 SP
▶ 6.11  12:00  14:15 LINE LP
 25.11  13:00  14:00   6 SP
 EVERY   8:00   8:15   8 SP
 18.11  10:00  12:00  10 LP
 --.--   -:--   -:--  --
```

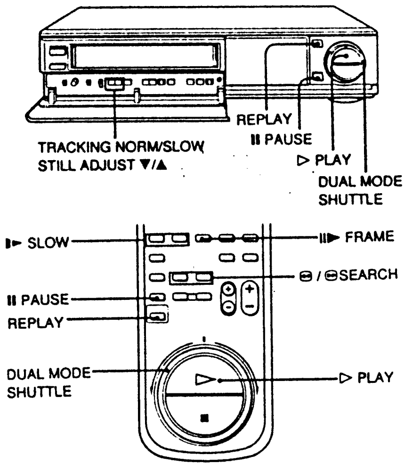
3. **To change the setting**
   Press ◀ or ▶ to blink the item to be changed, and make the necessary changes by pressing ▲ or ▼.
   To erase the setting
   Press TIMER REC CLEAR.

4. Press EXECUTE.
   The original screen appears.

5. Press TIMER REC ON/OFF.
   The VTR re-enters the timer recording standby mode.

Variable Speed Playback

You can play back the picture at various speeds: a still; slow motion; the normal speed; 2 times the normal speed and a higher speed playback (picture search), in forward direction, 2 times the normal speed and a higher speed playback in the reverse direction. You can enjoy the variable speed playback either by using the buttons on the Commander or the DUAL MODE SHUTTLE ring.



Still picture
During playback, press II PAUSE.
To resume normal playback, press II PAUSE again or press ▷ PLAY (the upper half of the DUAL MODE SHUTTLE ring).
When the pause mode lasts for more than approximately 5 minutes, the VTR will automatically enter the normal playback mode.

If bands appear on the top or bottom of the screen in the still mode
Change to the slow motion playback mode and adjust the picture with TRACKING NORM/SLOW and STILL ADJUST ▼/▲.

If the picture is shaking while in the still mode
Adjust the picture with TRACKING NORM/SLOW and STILL ADJUST ▼/▲.

Picture search
During playback, turn the DUAL MODE SHUTTLE ring clockwise to ▶▶ (forward direction) or turn it counterclockwise to ◀◀ (reverse direction). A high-speed picture without sound appears on the TV screen.
To resume normal playback, release the ring at a desired scene.

Locked picture search
During playback, press ⊖ SEARCH (reverse direction) or ⊖ SEARCH (forward direction). A high-speed picture appears on the screen even when you release the button. To resume normal playback, press ▷ PLAY.

Slow-motion picture
During playback or in the still mode, press I▶ SLOW + or - on the Commander. Change the slow-motion speed with the + (to increase) or - (to decrease) button.
The slow-motion picture is also obtained by turning the DUAL MODE SHUTTLE ring to 1/5.

Replay
During playback, press REPLAY on the Commander or the VTR once. The VTR stops and rewinds the tape for 3 seconds of the linear time counter, then plays it back in slow-motion playback mode. Press the button twice to rewind and replay the tape for 6 seconds of the linear time counter in slow-motion playback mode.

If streaks or noise bands appear during slow-motion playback
Adjust the picture with TRACKING NORM/SLOW and STILL ADJUST ▼/▲.

Frame-by-frame picture
In the still mode, press II▶ FRAME to advance the picture one frame.
To resume normal playback, press ▷ PLAY or II PAUSE.

2 times the normal speed picture
During playback or in the still mode, turn the DUAL MODE SHUTTLE ring clockwise to x 2 (forward direction). To play back in the reverse direction, turn the ring counterclockwise to x 2. When you release the ring, the VTR returns to the previous mode.

Watching the picture momentarily during the fast-forward or rewind
During fast-forward, turn the DUAL MODE SHUTTLE ring clockwise to ▶▶.
During rewind, turn the DUAL MODE SHUTTLE ring counterclockwise to ◀◀.
You can see the high-speed playback picture as long as you hold the ring in that position.
To return to the previous mode, release the ring.

Note on variable speed playback
Streaks or noise cannot be eliminated completely in the reverse playback.

Assigning a Desired Operation — AUTO MENU

You can select, in the AUTO MENU, a series of automatic tape operations.
It helps you to perform a certain tape transport job without your attendance. This section shows what you can do with the AUTO MENU and how to assign the desired function.

What You Can Do with the AUTO MENU

The functions included in the AUTO MENU are as follows:

- **PLAY - REW - POWER OFF**
  Plays back the tape, rewinds the tape when it reaches the end, and turns the power off.
- **GO TO ZERO - STOP**
  Searches for the counter zero point and stops.
- **GO TO ZERO - PLAY**
  Searches for the counter zero point and starts the playback.

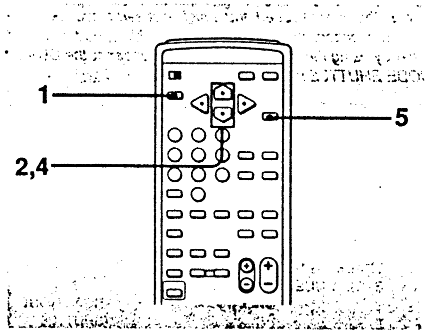
Note on "GO TO ZERO-STOP" and "GO TO ZERO-PLAY"
Before assigning these functions, press COUNTER RESET at the desired scene during recording or playback and stop the tape after recording or playback.
If the EXECUTE button is pressed at the counter zero point, a beep alerts you showing that the operation does not function.

- **GO TO REC START - PLAY**
  Searches for the recording start point and starts the playback.

Note
You cannot assign this function if the recording start point data has been erased by:
- Pressing COUNTER RESET
- Ejecting and re-inserting the cassette

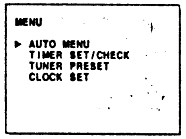
- **REW - POWER OFF**
  Rewinds the tape to the beginning and turns the power off.
- **REW - EJECT - POWER OFF**
  Rewinds the tape to the beginning, ejects the cassette, and turns off the power.
- **REW - PLAY**
  Rewinds the tape to the beginning and starts the playback.
- **REW - TIMER REC**
  Rewinds the tape to the beginning and enters the timer recording standby mode for timer recording when the timer is preset. A beep alerts you when the timer is not preset.
  A cassette with its safety tab removed will be ejected.
  When the VTR is in the timer recording standby mode, you can assign this function after cancelling the standby mode by pressing TIMER REC ON/OFF, and then turning on the VTR.

Assigning Your Desired AUTO MENU Function



1. Press MENU while the VTR is in the stop mode.
   The main MENU appears on the screen.

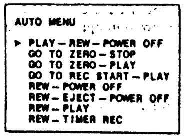
2. Press ▼ or ▲ to move the cursor (▶ mark) to AUTO MENU.



MENU

▶ AUTO MENU
TIMER SET/CHECK
TUNER PRESET
CLOCK SET

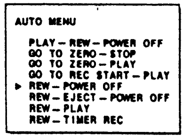
3. Press EXECUTE.
   The AUTO MENU will appear.



AUTO MENU

▶ PLAY – REW – POWER OFF
GO TO ZERO – STOP
GO TO ZERO – PLAY
GO TO REC START – PLAY
REW – POWER OFF
REW – EJECT – POWER OFF
REW – PLAY
REW – TIMER REC

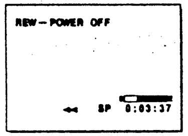
4. Press ▼ or ▲ to move the cursor to your desired AUTO MENU function.



AUTO MENU

PLAY – REW – POWER OFF
GO TO ZERO – STOP
GO TO ZERO – PLAY
GO TO REC START – PLAY
▶ REW – POWER OFF
REW – EJECT – POWER OFF
REW – PLAY
REW – TIMER REC

5. Press EXECUTE.
   The selected operation will begin.
   The selected operation mode will be superimposed on the TV screen for a few seconds. The AUTO indicator lights in the display window during the AUTO MENU operation.



REW – POWER OFF

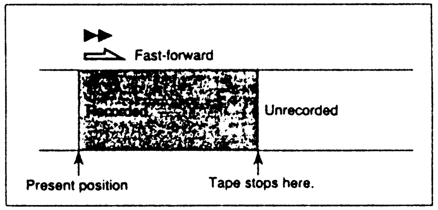
◀◀ SP 0:03:37

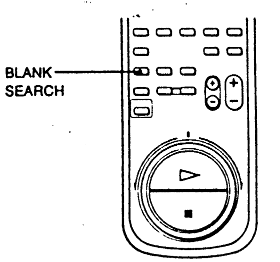
To return to the previous screen without executing any AUTO MENU operation
Press MENU instead of EXECUTE in step 5.

Notes on AUTO MENU operation
- You cannot assign the AUTO MENU operation if the VTR is in modes other than the stop mode. (A beep sounds.)
- If a beep sounds when you press EXECUTE, no cassette is inserted.

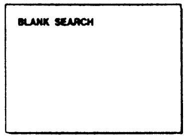
Blank Search Function

The VTR searches for the unrecorded (blank) portion of the tape and stops automatically with this function.
You can use this function if you want to start recording again at the end of the previous recording.





Press BLANK SEARCH in the stop or playback mode.
During searching, the AUTO indicator will appear in the display window and BLANK SEARCH is superimposed on the TV screen.



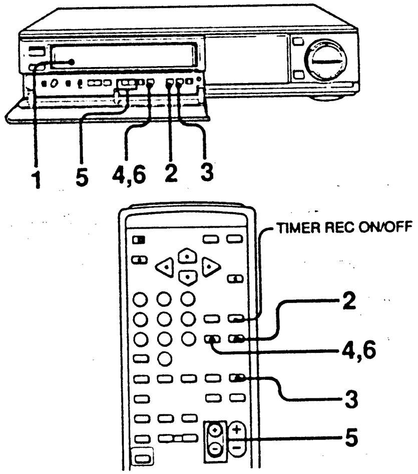
BLANK SEARCH

The tape advances rapidly and automatically stops at the beginning of the next blank portion.

Notes
- If a blank tape or a tape with no blanks is used, the VTR searches for the blank all the way to the tape end and then starts searching towards the beginning of the tape.
  Searching stops at the beginning of the tape.
- The stopping position may vary slightly.

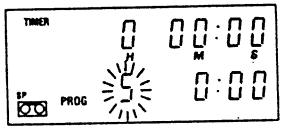
Quick-Timer Recording

If you want to start timer recording immediately, use the quick-timer recording function. You can set the recording duration in units of 30 minutes, up to 8 hours.

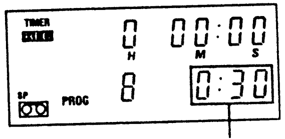

1
5
4,6
2
3
TIMER REC ON/OFF
2
4,6
3
5

If you are recording, skip steps 1 to 4.

1. Insert a cassette with a safety tab.
2. Press INPUT SELECT to light the PROG indicator in the display window.
3. Press TAPE SPEED to select the tape speed.
4. Press QUICK TIMER on the VTR or QTR REC TIME on the Commander.
   The TIMER indicator lights, and the program position number blinks in the display window.
   A cassette with its safety tab removed will be ejected.


TIMER
0 00:00
H M S
SP
PROG
5
0:00

5. Press PROG +/– (or PROGRAM +/–) to select the grogram position to be recorded.
6. Press QTR REC TIME (or QUICK TIMER) again to start recording.
   Each press of the button increases recording duration in units of 30 minutes.


TIMER
0 00:00
H M S
SP
PROG
8
0:30

Recording duration

The recording duration decreases minute by minute until 0:00 appears, and then the VTR turns off automatically.

To stop quick-timer recording
Press TIMER REC ON/OFF.

To extend the recording duration during recording
Press QTR REC TIME (or QUICK TIMER) desired number of times. One press of the button increases the duration by 30 minutes.

A warning beep sounds in the following cases:
- If you press QTR REC TIME (or QUICK TIMER) when the safety tab of the cassette is removed.
- You try to set for timer recording during quick timer recording.
- You try to reset the clock during quick timer recording.

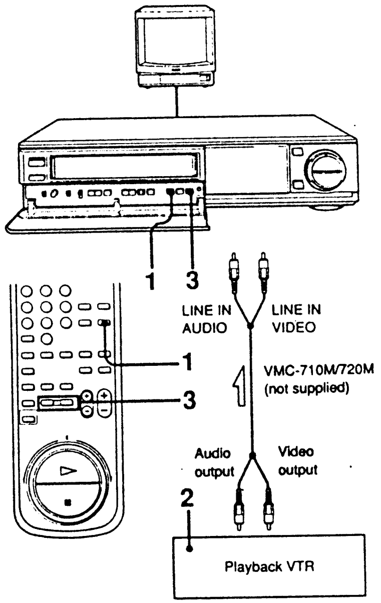
Buttons operable during quick timer recording
- TIMER REC ON/OFF stops quick timer recording.
- QTR REC TIME (or QUICK TIMER) changes recording duration.
- COUNTER RESET resets the counter to zero.
- MENU displays the TIMER SET/CHECK menu to check the preset timer settings.

If a power interruption occurs during quick timer recording
Recording will stop and the VTR turns off. If the power interruption lasted for less than one hour and recovered within the quick timer duration, recording will resume from that instant.

Editing with Another VTR

Connect this VTR to another VTR using the VIDEO/AUDIO jacks. If the TV is connected to the LINE OUT AUDIO/VIDEO jacks of this VTR, disconnect it, and then reconnect it to another VTR.

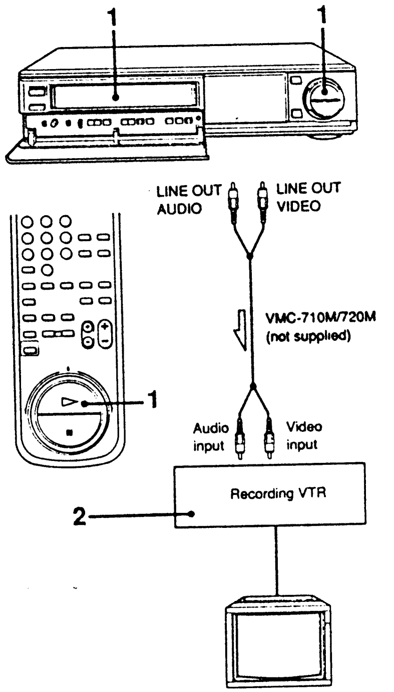
Editing Tapes from Another VTR


1
3
LINE IN AUDIO
LINE IN VIDEO
1
3
VMC-710M/720M (not supplied)
Audio output
Video output
2
Playback VTR

How to operate

1. Press INPUT SELECT so that the LINE indicator lights in the display window.
2. Insert a source cassette into another VTR and start playback.
3. Start recording with this VTR.

Editing Tapes onto Another VTR


1
1
LINE OUT AUDIO
LINE OUT VIDEO
VMC-710M/720M (not supplied)
1
Audio input
Video input
Recording VTR
2

How to operate

1. Insert a source cassette into this VTR and start playback.
2. Set the input selector to LINE and start recording with another VTR.

SECTION 2
DISASSEMBLY

2-1. REMOVAL OF UPPER CASE

It is widen on both sides the back of upper case and remove up direction.

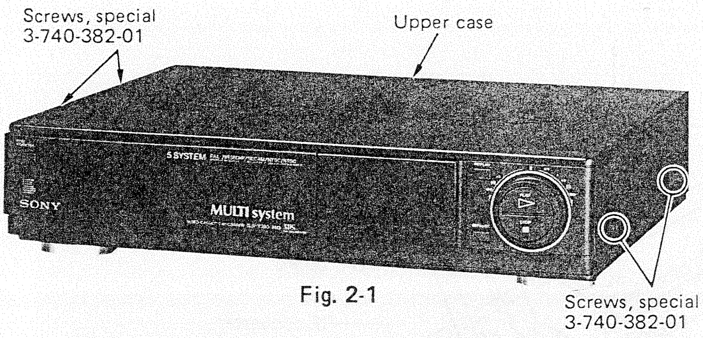

Screws, special
3-740-382-01
Upper case
SONY
MULTI system
Screws, special
3-740-382-01

Fig. 2-1

Then remove the upper case.

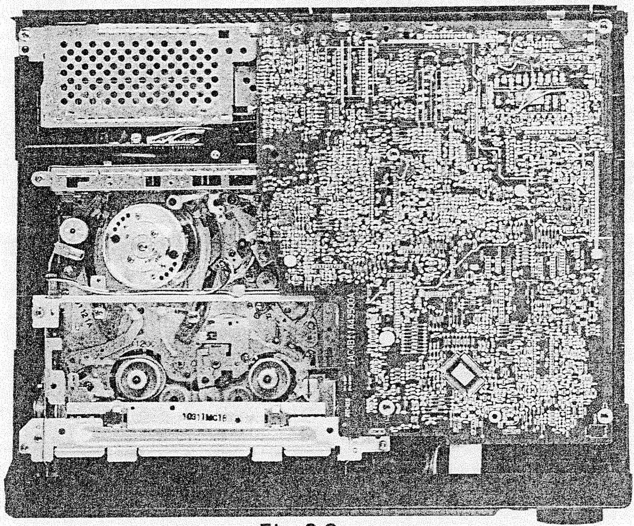


Fig. 2-2

2-2. REMOVAL OF BOTTOM PLATE

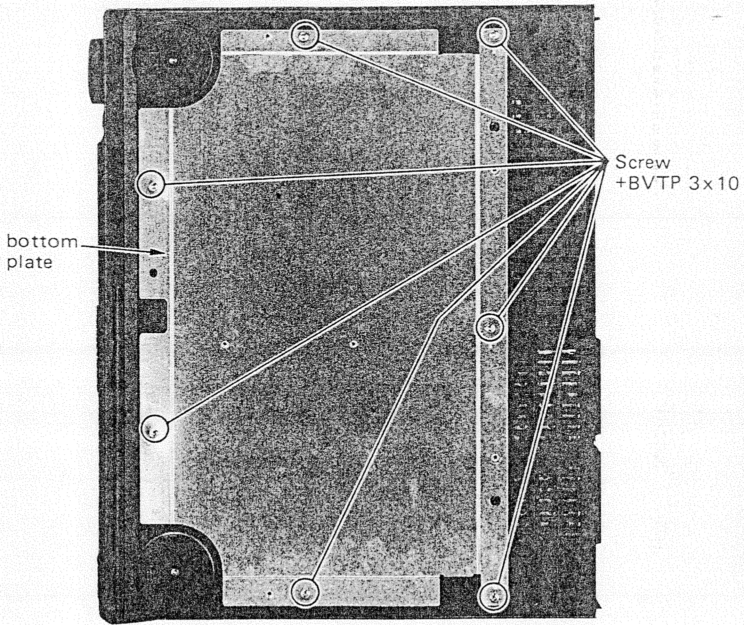

Screw
+BVTP 3x10
bottom plate

Fig. 2-3

Then remove the bottom plate.

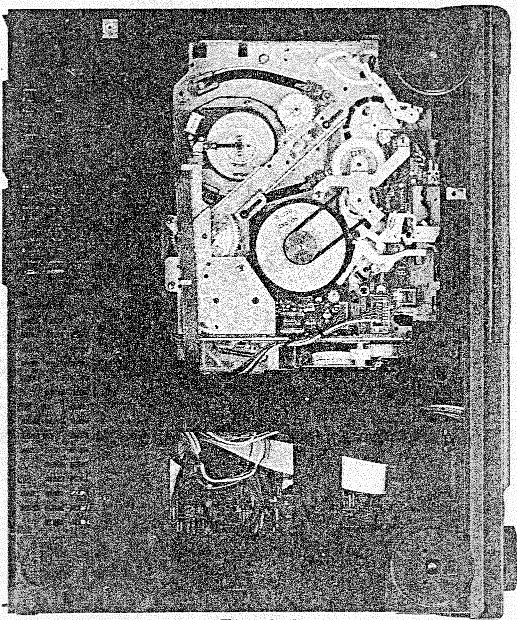


Fig. 2-4

2-3. REMOVAL OF FRONT CABINET

The remove the upper case, and bottom plate and raise up the claws front cabinet (three places) as shown by Fig. 2-5, and remove front cabinet in the arrow direction.

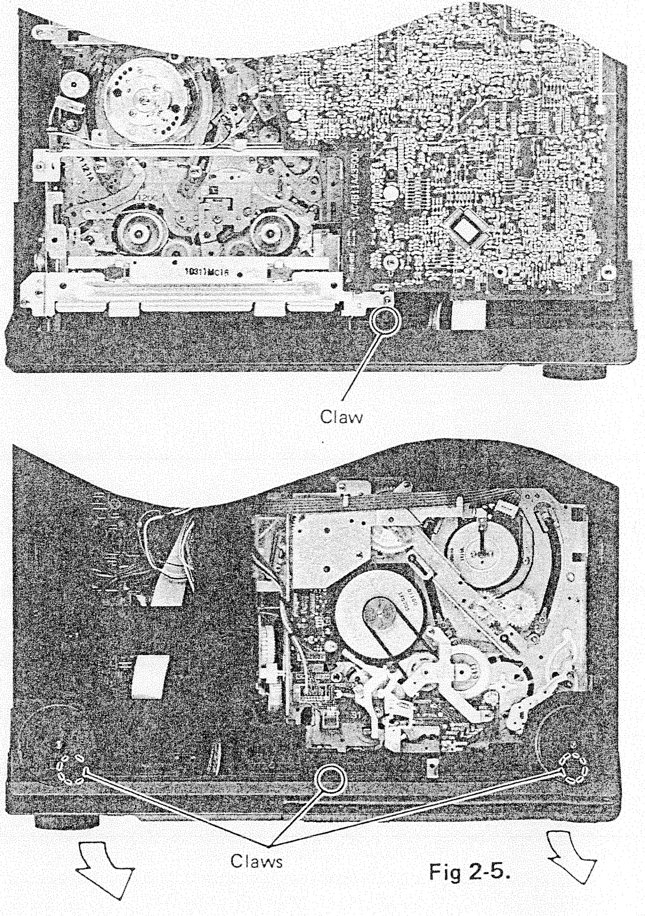
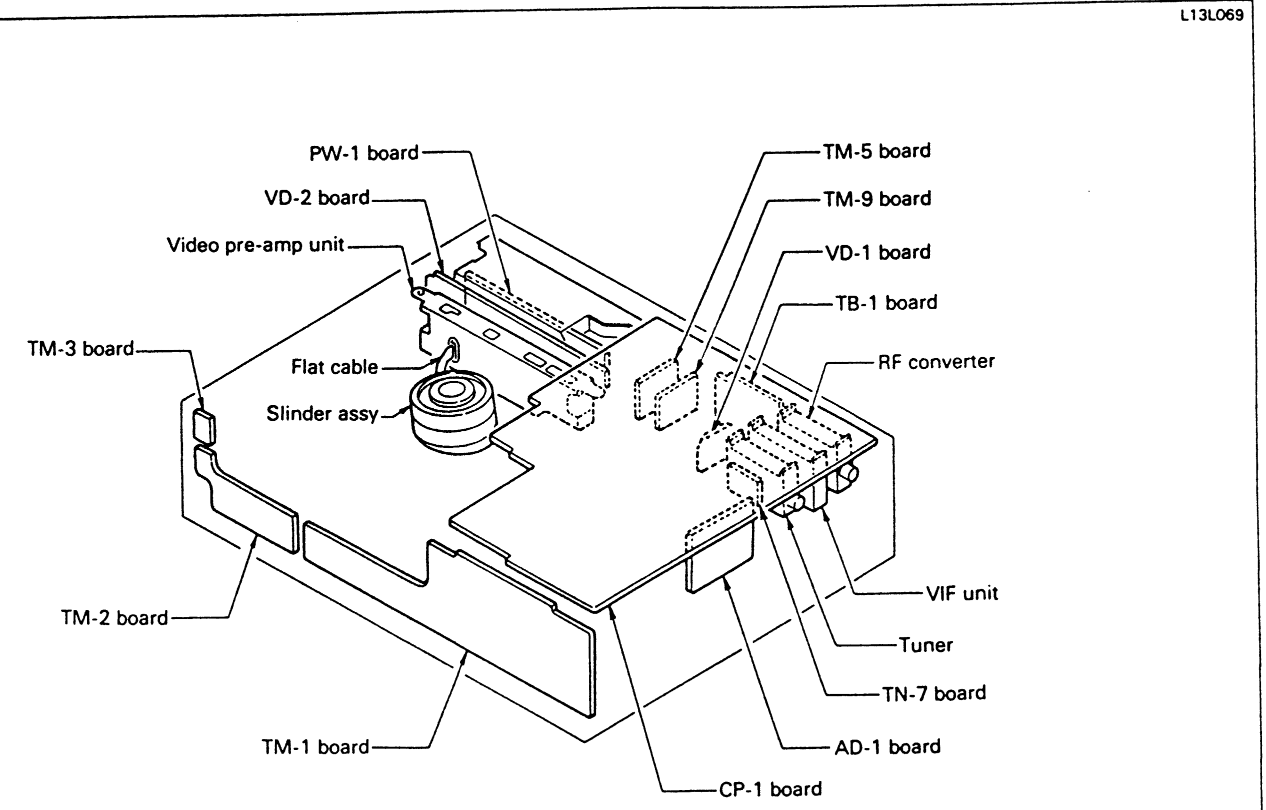


Fig 2-5.

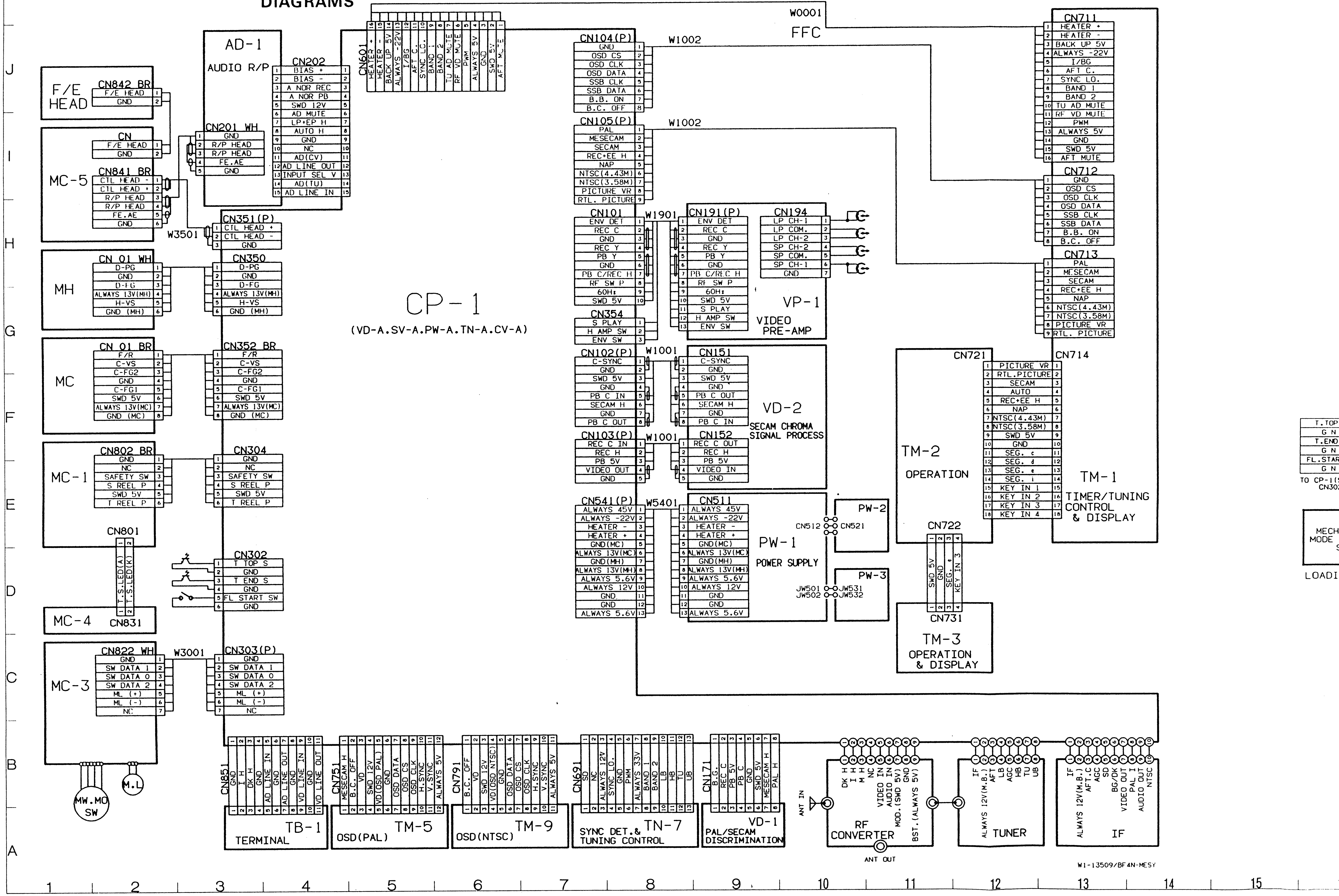
SECTION 3
DIAGRAMS

CIRCUIT BOARD LOCATIONS

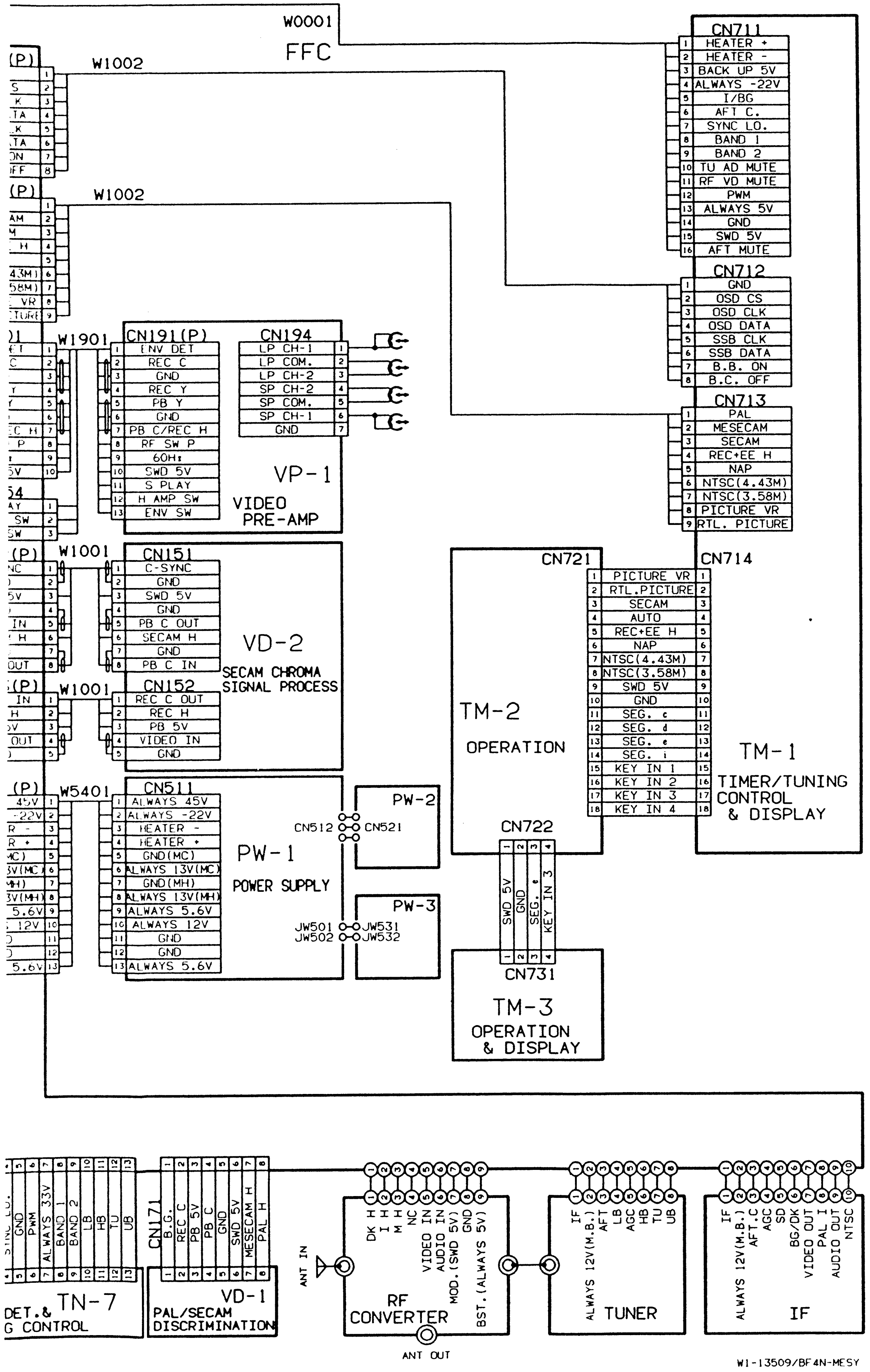

L13L069
PW-1 board
VD-2 board
Video pre-amp unit
TM-3 board
Flat cable
Slinder assy
TM-2 board
TM-1 board
TM-5 board
TM-9 board
VD-1 board
TB-1 board
RF converter
VIF unit
Tuner
TN-7 board
AD-1 board
CP-1 board

SECTION 3
DIAGRAMS

OVERALL WIRING DIAGRAM

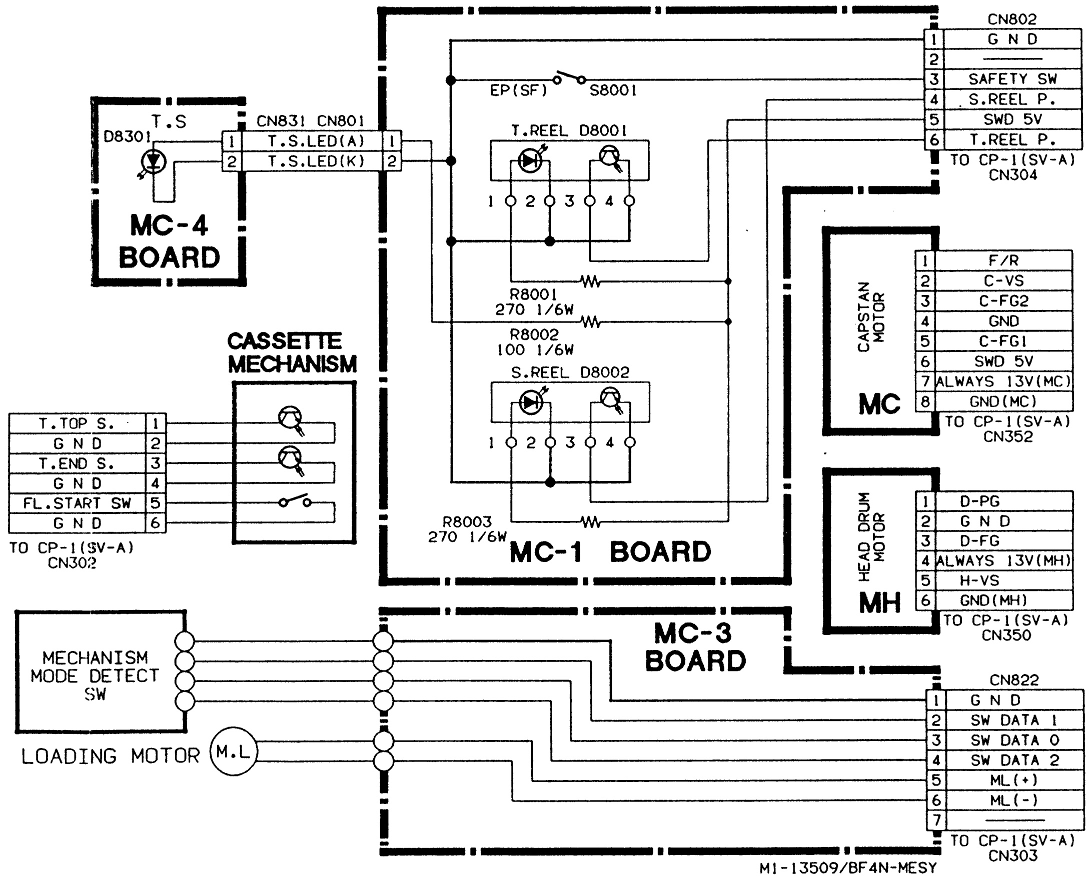

F/E HEAD
CN842 BR
MC-5
CN841 BR
W3501
MH
CN 01 WH
MC
CN 01 BR
MC-1
CN802 BR
CN801
T.S.LED(A)
T.S.LED(K)
MC-4
CN831
MC-3
CN822 WH
W3001
MW.MO SW
M.L
AD-1
AUDIO R/P
CN202
CN201 WH
CN351(P)
CN350
CN352 BR
CN304
CN302
T TOP S
T END S
FL START SW
CN303(P)
CN601
CP-1
(VD-A.SV-A.PW-A.TN-A.CV-A)
CN104(P)
W1002
CN105(P)
W1002
CN101
W1901
CN354
CN191(P)
CN194
VP-1
VIDEO PRE-AMP
CN102(P)
W1001
CN151
VD-2
SECAM CHROMA SIGNAL PROCESS
CN103(P)
W1001
CN152
CN541(P)
W5401
CN511
PW-1
POWER SUPPLY
CN512
CN521
PW-2
JW501
JW502
JW531
JW532
PW-3
W0001
FFC
CN711
CN712
CN713
CN714
CN721
TM-2
OPERATION
TM-1
TIMER/TUNING CONTROL & DISPLAY
CN722
CN731
TM-3
OPERATION & DISPLAY
CN851
TB-1
TERMINAL
CN751
TM-5
OSD(PAL)
CN791
TM-9
OSD(NTSC)
CN691
TN-7
SYNC DET.& TUNING CONTROL
CN171
VD-1
PAL/SECAM DISCRIMINATION
ANT IN
RF CONVERTER
ANT OUT
TUNER
IF
MECH MODE
LOADI
TO CP-1
W1-13509/BF4N-MESY

IAGRAM



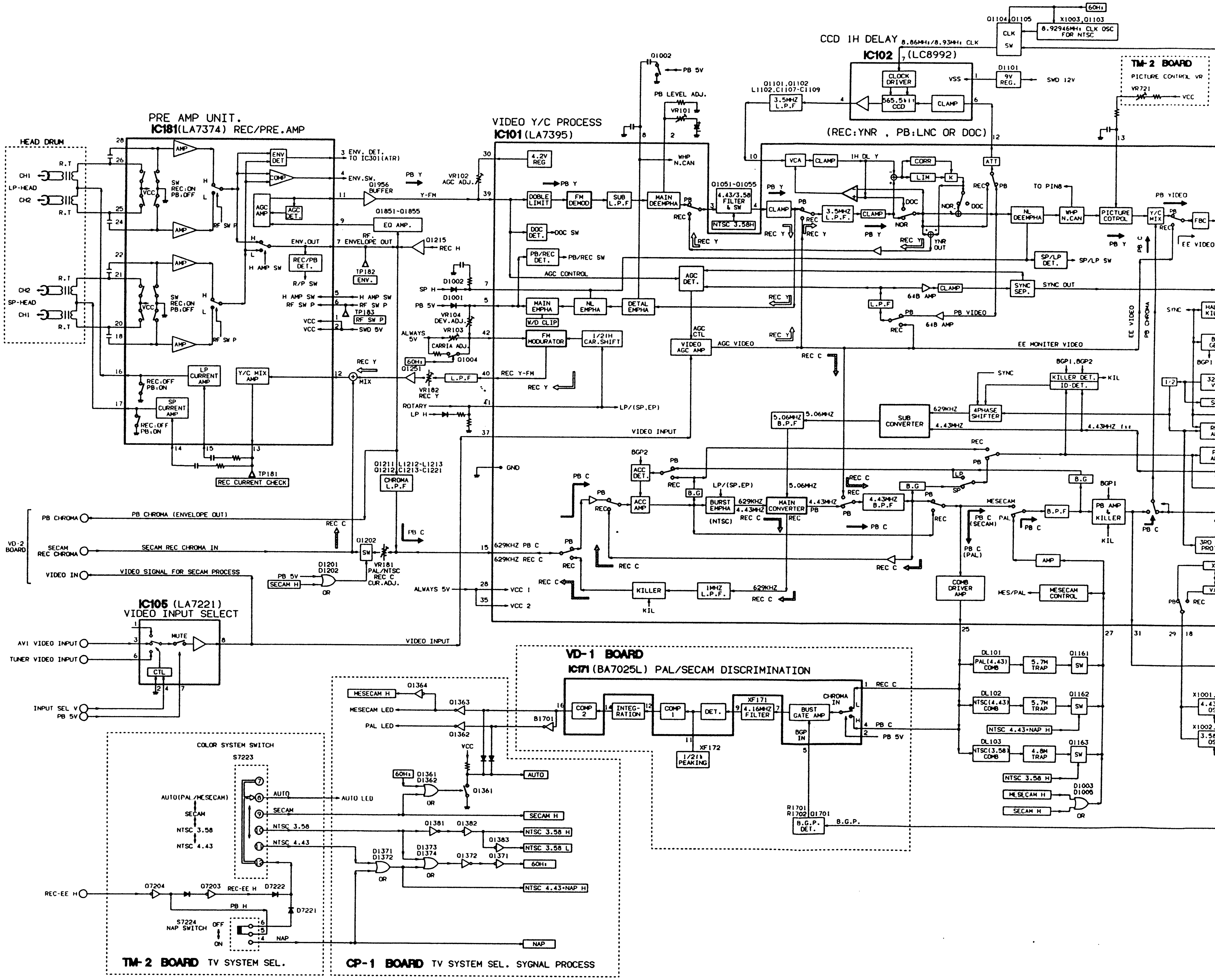
W0001
FFC
W1002
W1002
W1901
W1001
W1001
W5401
CN711
HEATER +
HEATER -
BACK UP 5V
ALWAYS -22V
I/BG
AFT C.
SYNC LO.
BAND 1
BAND 2
TU AD MUTE
RF VD MUTE
PWM
ALWAYS 5V
GND
SWD 5V
AFT MUTE
CN712
GND
OSD CS
OSD CLK
OSD DATA
SSB CLK
SSB DATA
B.B. ON
B.C. OFF
CN713
PAL
MESECAM
SECAM
REC+EE H
NAP
NTSC(4.43M)
NTSC(3.58M)
PICTURE VR
RTL. PICTURE
CN714
CN721
PICTURE VR
RTL.PICTURE
SECAM
AUTO
REC+EE H
NAP
NTSC(4.43M)
NTSC(3.58M)
SWD 5V
GND
SEG. c
SEG. d
SEG. e
SEG. i
KEY IN 1
KEY IN 2
KEY IN 3
KEY IN 4
TM-2
OPERATION
TM-1
TIMER/TUNING CONTROL & DISPLAY
CN722
SWD 5V
GND
SEG. e
KEY IN 3
CN731
TM-3
OPERATION & DISPLAY
CN191(P)
ENV DET
REC C
GND
REC Y
PB Y
GND
PB C/REC H
RF SW P
60Hz
SWD 5V
S PLAY
H AMP SW
ENV SW
CN194
LP CH-1
LP COM.
LP CH-2
SP CH-2
SP COM.
SP CH-1
GND
VP-1
VIDEO PRE-AMP
CN151
C-SYNC
GND
SWD 5V
GND
PB C OUT
SECAM H
GND
PB C IN
CN152
REC C OUT
REC H
PB 5V
VIDEO IN
GND
VD-2
SECAM CHROMA SIGNAL PROCESS
CN511
ALWAYS 45V
ALWAYS -22V
HEATER -
HEATER +
GND(MC)
ALWAYS 13V(MC)
GND(MH)
ALWAYS 13V(MH)
ALWAYS 5.6V
ALWAYS 12V
GND
GND
ALWAYS 5.6V
PW-1
POWER SUPPLY
CN512
CN521
PW-2
PW-3
JW501
JW502
JW531
JW532
GND
PWM
ALWAYS 33V
BAND 1
BAND 2
LB
HB
TU
UB
TN-7
DET.&
G CONTROL
CN171
B.G.
REC C
PB 5V
PB C
GND
SWD 5V
MESECAM H
PAL H
VD-1
PAL/SECAM DISCRIMINATION
ANT IN
DK H
I H
M H
NC
VIDEO IN
AUDIO IN
MOD.(SWD 5V)
GND
BST.(ALWAYS 5V)
RF CONVERTER
ANT OUT
IF
ALWAYS 12V(M.B.)
AFT
LB
AGC
HB
TU
UB
TUNER
IF
ALWAYS 12V(M.B.)
AFT.C
AGC
SD
BG/DK
VIDEO OUT
PAL I
AUDIO OUT
NTSC
IF
W1-13509/BF4N-MESY

MECHANISM CONNECTION CIRCUIT DIAGRAM

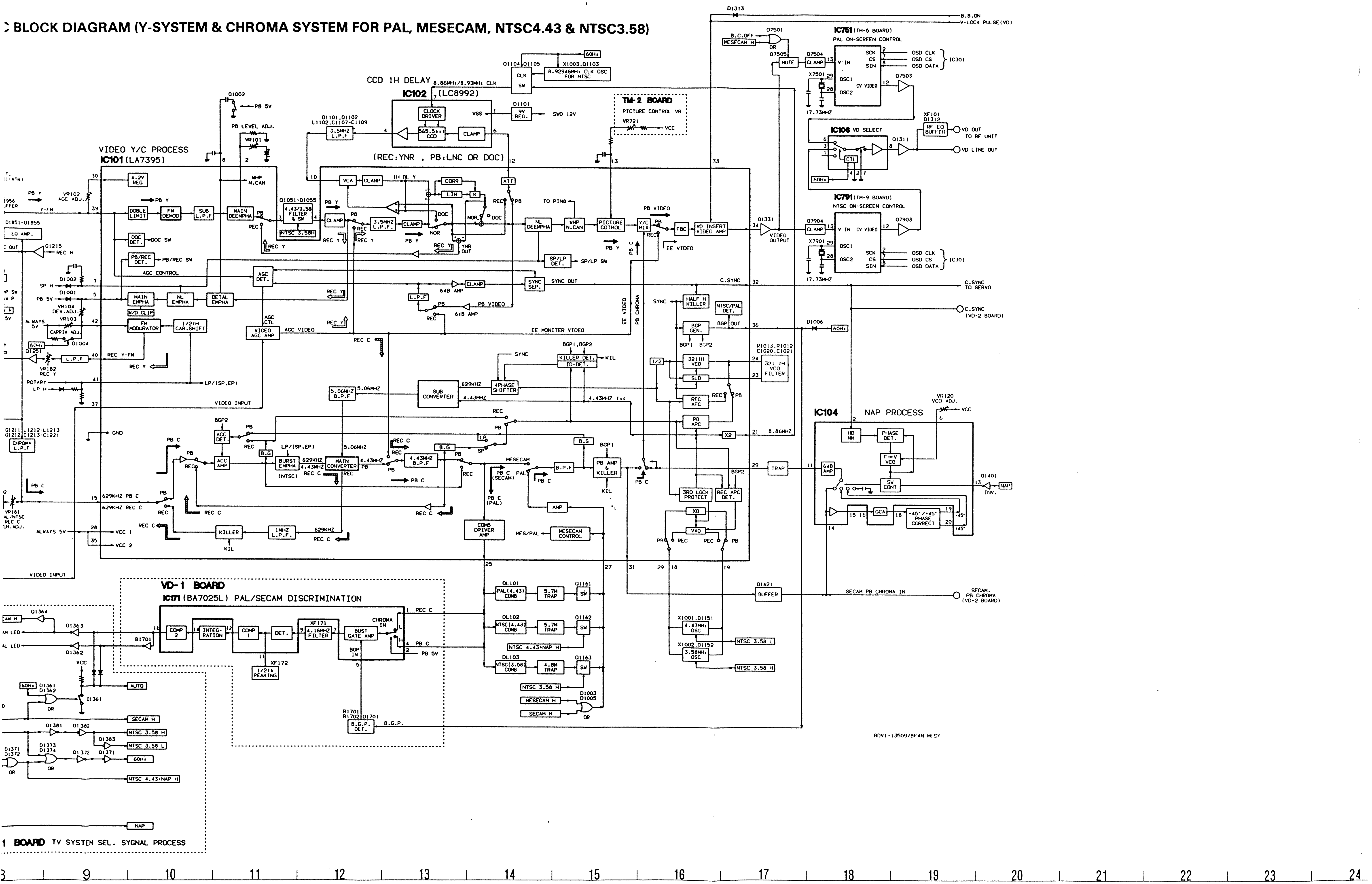


CN802
G N D
SAFETY SW
S.REEL P.
SWD 5V
T.REEL P.
TO CP-1(SV-A) CN304
EP(SF)
S8001
T.S
D8301
CN831 CN801
T.S.LED(A)
T.S.LED(K)
MC-4 BOARD
T.REEL D8001
R8001 270 1/6W
R8002 100 1/6W
S.REEL D8002
R8003 270 1/6W
MC-1 BOARD
CASSETTE MECHANISM
T.TOP S.
G N D
T.END S.
G N D
FL.START SW
G N D
TO CP-1(SV-A) CN302
CAPSTAN MOTOR
MC
F/R
C-VS
C-FG2
GND
C-FG1
SWD 5V
ALWAYS 13V(MC)
GND(MC)
TO CP-1(SV-A) CN352
HEAD DRUM MOTOR
MH
D-PG
G N D
D-FG
ALWAYS 13V(MH)
H-VS
GND(MH)
TO CP-1(SV-A) CN350
MC-3 BOARD
MECHANISM MODE DETECT SW
LOADING MOTOR
M.L
CN822
G N D
SW DATA 1
SW DATA 0
SW DATA 2
ML(+)
ML(-)
TO CP-1(SV-A) CN303
M1-13509/BF4N-MESY

VIDEO CIRCUIT BASIC BLOCK DIAGRAM (Y-SYSTEM & CHROMA SYSTEM FOR PAL, MESECAM, NTSC4.43 & NTSC3.58)


K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
HEAD DRUM
LP-HEAD
SP-HEAD
PRE AMP UNIT.
IC181(LA7374) REC/PRE.AMP
ENV DET
COMP
AGC AMP
AGC DET.
REC/PB DET.
LP CURRENT AMP
SP CURRENT AMP
Y/C MIX AMP
REC CURRENT CHECK
TP181
TP182 ENV.
TP183 RF SW P
Q1956 BUFFER
Q1851-Q1855 EQ AMP.
Q1215
VIDEO Y/C PROCESS
IC101(LA7395)
4.2V REG
DOBLE LIMIT
FM DEMOD
SUB L.P.F
MAIN DEEMPHA
DOC DET.
PB/REC DET.
AGC CONTROL
MAIN EMPHA
NL EMPHA
DETAL EMPHA
W/D CLIP
FM MODURATOR
1/2H CAR.SHIFT
VIDEO AGC AMP
AGC DET.
L.P.F
VR101 PB LEVEL ADJ.
VR102 AGC ADJ.
VR103 CARRIA ADJ.
VR104 DEV.ADJ.
VR182 REC Y
CCD 1H DELAY
IC102 (LC8992)
CLOCK DRIVER
565.5H CCD
CLAMP
9V REG.
CLK SW
8.92946MHz CLK OSC FOR NTSC
(REC:YNR , PB:LNC OR DOC)
3.5MHZ L.P.F
4.43/3.58 FILTER & SW
NTSC 3.58H
VCA
CLAMP
1H DL Y
CORR
LIM
3.5MHZ L.P.F.
ATT
NL DEEMPHA
WHP N.CAN
PICTURE COTPOL
Y/C MIX
FBC
SP/LP DET.
SYNC SEP.
TM-2 BOARD
PICTURE CONTROL VR
VR721
EE MONITER VIDEO
5.06MHZ B.P.F
SUB CONVERTER
4PHASE SHIFTER
KILLER DET. ID-DET.
ACC DET.
ACC AMP
BURST EMPHA
MAIN CONVERTER
4.43MHZ B.P.F
B.P.F
PB AMP & KILLER
KILLER
1MHZ L.P.F.
COMB DRIVER AMP
MESECAM CONTROL
AMP
VD-2 BOARD
PB CHROMA
SECAM REC CHROMA
VIDEO IN
PB CHROMA (ENVELOPE OUT)
SECAM REC CHROMA IN
VIDEO SIGNAL FOR SECAM PROCESS
Q1202 SW
VR181 PAL/NTSC REC C CUR.ADJ.
Q1201 Q1202 OR
CHROMA L.P.F
IC105 (LA7221)
VIDEO INPUT SELECT
AV1 VIDEO INPUT
TUNER VIDEO INPUT
INPUT SEL V
PB 5V
MUTE
CTL
VIDEO INPUT
VD-1 BOARD
IC171 (BA7025L) PAL/SECAM DISCRIMINATION
COMP 2
INTEG-RATION
COMP 1
DET.
XF171 4.16MHZ FILTER
BUST GATE AMP
XF172 1/2H PEAKING
B.G.P. DET.
DL101 PAL(4.43) COMB
DL102 NTSC(4.43) COMB
DL103 NTSC(3.58) COMB
5.7M TRAP
4.8M TRAP
Q1161 SW
Q1162 SW
Q1163 SW
NTSC 4.43+NAP H
NTSC 3.58 H
MESECAM H
SECAM H
D1003 D1006 OR
COLOR SYSTEM SWITCH
S7223
AUTO(PAL/MESECAM)
SECAM
NTSC 3.58
NTSC 4.43
REC-EE H
S7224 NAP SWITCH
OFF
ON
D7221
TM-2 BOARD TV SYSTEM SEL.
CP-1 BOARD TV SYSTEM SEL. SYGNAL PROCESS
MESECAM H
MESECAM LED
PAL LED
AUTO LED
AUTO
SECAM H
NTSC 3.58 H
NTSC 3.58 L
60Hz
NTSC 4.43+NAP H
NAP
OR

BLOCK DIAGRAM (Y-SYSTEM & CHROMA SYSTEM FOR PAL, MESECAM, NTSC4.43 & NTSC3.58)


VIDEO Y/C PROCESS
IC101 (LA7395)
CCD 1H DELAY
IC102 (LC8992)
(REC:YNR , PB:LNC OR DOC)
CLOCK DRIVER
565.5kH CCD
CLAMP
3.5MHZ L.P.F
D1101 9V REG.
SWD 12V
CLK SW
8.86MHz/8.93MHz CLK
8.92946MHz CLK OSC FOR NTSC
X1003,Q1103
60Hz
TM-2 BOARD
PICTURE CONTROL VR
VR721
VCC
PB LEVEL ADJ.
VR101
Q1002
PB 5V
4.2V REG
DOBLE LIMIT
FM DEMOD
SUB L.P.F
MAIN DEEMPHA
WHP N.CAN
4.43/3.58 FILTER & SW
NTSC 3.58H
Q1051-Q1055
CLAMP
3.5MHZ L.P.F.
VCA
CLAMP
1H DL Y
CORR
LIM
K
NOR
DOC
YNR OUT
NL DEEMPHA
WHP N.CAN
PICTURE COTROL
Y/C MIX
PB VIDEO
FBC
VD INSERT VIDEO AMP
EE VIDEO
VIDEO OUTPUT
ATT
TO PIN8
DOC DET.
DOC SW
PB/REC DET.
PB/REC SW
AGC CONTROL
AGC DET.
SP/LP DET.
SP/LP SW
SYNC SEP.
SYNC OUT
C.SYNC
CLAMP
6dB AMP
L.P.F
MAIN EMPHA
NL EMPHA
DETAL EMPHA
W/D CLIP
FM MODURATOR
1/2IH CAR.SHIFT
VIDEO AGC AMP
AGC VIDEO
AGC CTL
EE MONITER VIDEO
VIDEO INPUT
REC Y-FM
LP/(SP,EP)
ROTARY
HALF H KILLER
NTSC/PAL DET.
BGP GEN.
BGP1 BGP2
KILLER DET. ID-DET.
KIL
4PHASE SHIFTER
SUB CONVERTER
5.06MHZ B.P.F
629KHZ
4.43MHZ
321fH VCO
SLD
REC AFC
PB APC
X2
8.86MHZ
R1013,R1012 C1020,C1021
321 fH VCO FILTER
ACC DET.
ACC AMP
B.G
LP/(SP,EP)
BURST EMPHA
MAIN CONVERTER
4.43MHZ B.P.F
B.P.F
PB AMP & KILLER
TRAP
MESECAM
PB C (SECAM)
PB C (PAL)
COMB DRIVER AMP
AMP
MESECAM CONTROL
MES/PAL
3RD LOCK PROTECT
REC APC DET.
XO
VXO
KILLER
1MHZ L.P.F.
629KHZ PB C
629KHZ REC C
ALWAYS 5V
VCC 1
VCC 2
GND
CHROMA L.P.F
VR102 AGC ADJ.
VR104 DEV.ADJ.
VR103 CARRIA ADJ.
VR182
VR181
Q1001
Q1002
Q1004
Q1215
Q1251
Q1851-Q1855
EQ AMP.
Q1211 L1212-L1213
Q1212 C1213-C1221
IC751 (TM-5 BOARD)
PAL ON-SCREEN CONTROL
Q7501
B.C.OFF
MESECAM H
OR
Q7505 MUTE
Q7504 CLAMP
X7501
17.73MHZ
V IN
OSC1
OSC2
SCK CS SIN
CV VIDEO
Q7503
OSD CLK
OSD CS
OSD DATA
IC301
IC106 VD SELECT
CTL
Q1311
XF101 Q1312
RF EQ BUFFER
VD OUT TO RF UNIT
VD LINE OUT
IC791 (TM-9 BOARD)
NTSC ON-SCREEN CONTROL
Q7904 CLAMP
X7901
Q7903
Q1331
D1313
B.B.ON
V-LOCK PULSE(VD)
C.SYNC TO SERVO
C.SYNC (VD-2 BOARD)
D1006
IC104
NAP PROCESS
VR120 VCO ADJ.
HD MM
PHASE DET.
F→V VCO
SW CONT
6dB AMP
GCA
-45°/+45° PHASE CORRECT
Q1401 INV.
NAP
Q1421 BUFFER
SECAM PB CHROMA IN
SECAM PB CHROMA (VD-2 BOARD)
DL101 PAL(4.43) COMB
5.7M TRAP
Q1161 SW
DL102 NTSC(4.43) COMB
Q1162
NTSC 4.43+NAP H
DL103 NTSC(3.58) COMB
4.8M TRAP
Q1163
NTSC 3.58 H
MESECAM H
SECAM H
D1003 D1005
X1001,Q1151 4.43MHz OSC
X1002,Q1152 3.58MHz OSC
NTSC 3.58 L
VD-1 BOARD
IC171 (BA7025L) PAL/SECAM DISCRIMINATION
COMP 2
INTEGE-RATION
COMP 1
DET.
XF171 4.16MHZ FILTER
BUST GATE AMP
CHROMA IN
BGP IN
1/2fH PEAKING
XF172
REC C
PB C
PB 5V
R1701 R1702 Q1701
B.G.P. DET.
B.G.P.
B1701
Q1364
Q1363
Q1362
Q1361
Q1381 Q1382
Q1383
Q1371 Q1372
Q1373 Q1374
D1371 D1372
AUTO
SECAM H
NTSC 3.58 H
NTSC 3.58 L
60Hz
NTSC 4.43+NAP H
NAP
1 BOARD TV SYSTEM SEL. SYGNAL PROCESS
BDV1-13509/BF4N MESY
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

K

J

I

H

G

F

E

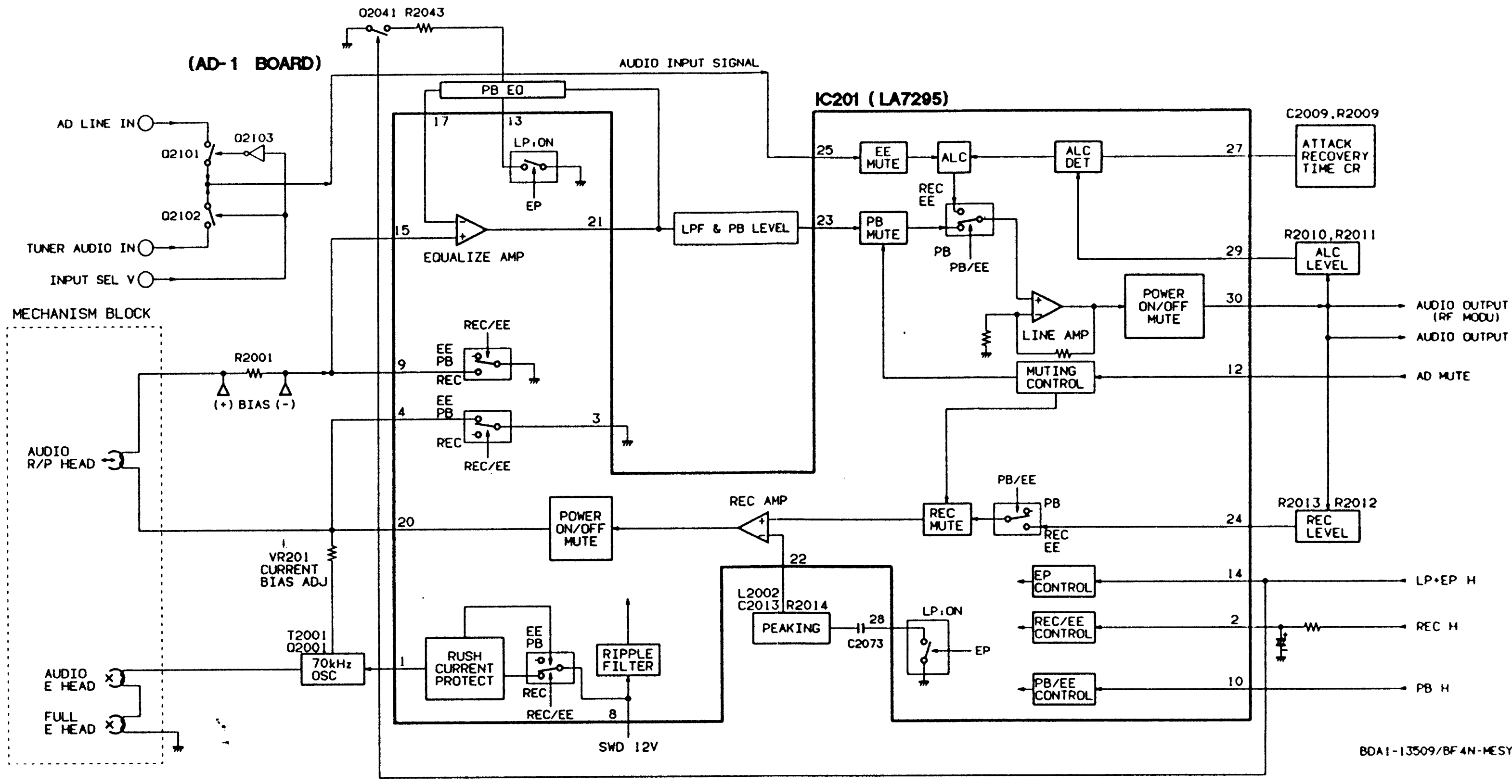
D

C

B

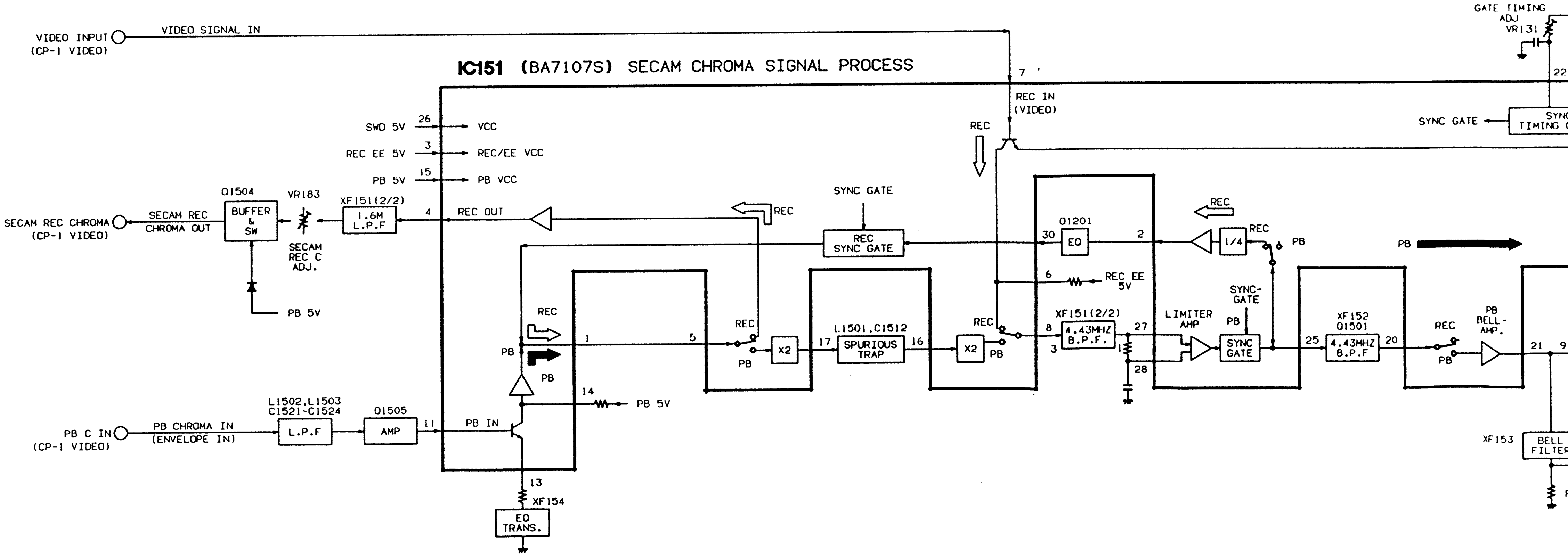
A

AUDIO CIRCUIT BASIC BLOCK DIAGRAM



Q2041 R2043
(AD-1 BOARD)
AUDIO INPUT SIGNAL
PB EQ
IC201 (LA7295)
C2009,R2009
AD LINE IN
Q2101
Q2103
Q2102
TUNER AUDIO IN
INPUT SEL V
17
13
LP:ON
EP
15
EQUALIZE AMP
21
LPF & PB LEVEL
25
EE MUTE
ALC
ALC DET
27
ATTACK RECOVERY TIME CR
23
PB MUTE
REC EE
PB
PB/EE
29
R2010,R2011
ALC LEVEL
LINE AMP
POWER ON/OFF MUTE
30
AUDIO OUTPUT (RF MODU)
AUDIO OUTPUT
MECHANISM BLOCK
R2001
(+) BIAS (-)
REC/EE
EE PB
REC
9
4
3
MUTING CONTROL
12
AD MUTE
AUDIO R/P HEAD
PB/EE
PB
REC MUTE
REC EE
24
R2013 R2012
REC LEVEL
20
POWER ON/OFF MUTE
REC AMP
22
VR201 CURRENT BIAS ADJ
L2002 C2013 R2014
PEAKING
28
C2073
LP:ON
EP
14
EP CONTROL
LP+EP H
2
REC/EE CONTROL
REC H
T2001 Q2001
70kHz OSC
1
RUSH CURRENT PROTECT
EE PB
REC
REC/EE
RIPPLE FILTER
8
SWD 12V
10
PB/EE CONTROL
PB H
AUDIO E HEAD
FULL E HEAD
BDA1-13509/BF4N-MESY

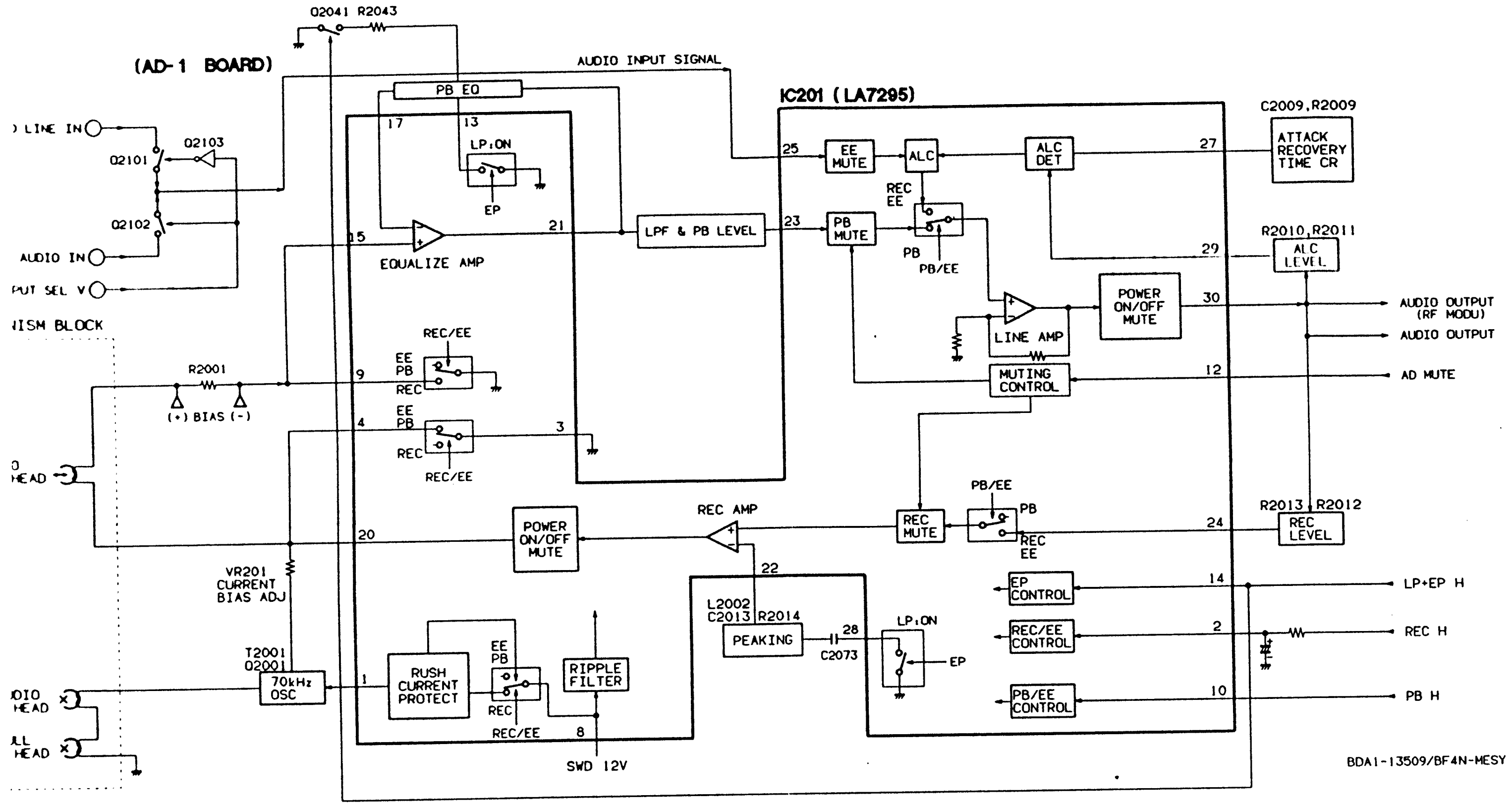
SECAM CHROMA SIGNAL PROCESS CIRCUIT BASIC BLOCK DIAGRAM (VD-2 BOARD)



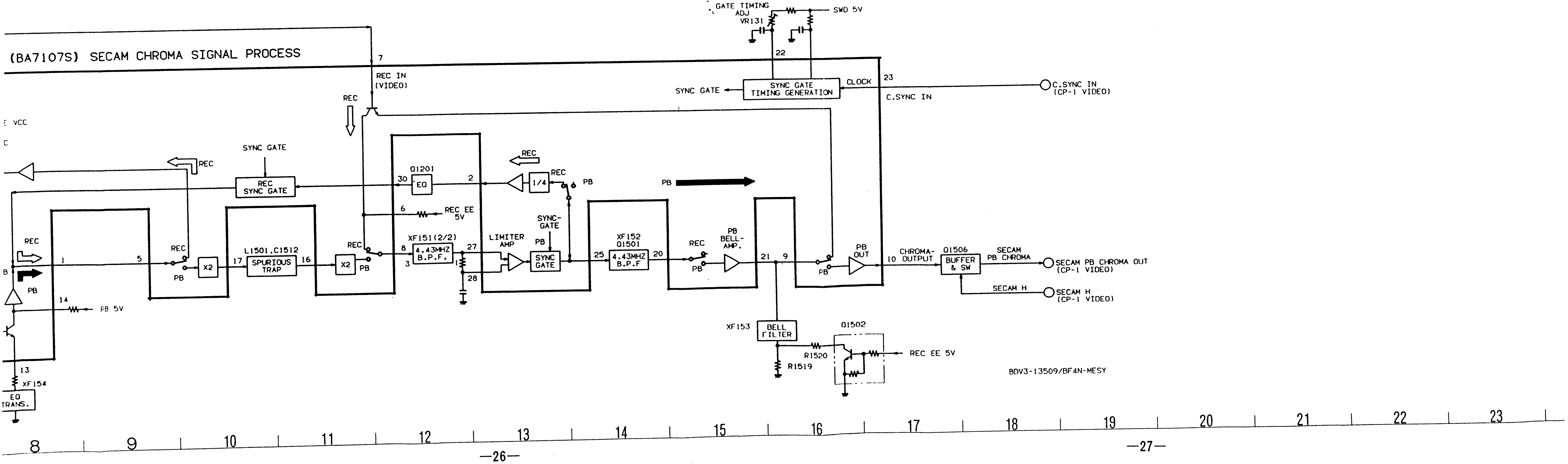
VIDEO INPUT (CP-1 VIDEO)
VIDEO SIGNAL IN
GATE TIMING ADJ VR131
IC151 (BA7107S) SECAM CHROMA SIGNAL PROCESS
7
22
REC IN (VIDEO)
SWD 5V
26
VCC
REC EE 5V
3
REC/EE VCC
PB 5V
15
PB VCC
REC
SYNC GATE
SYNC TIMING
Q1504
VR183
XF151(2/2)
SECAM REC CHROMA (CP-1 VIDEO)
SECAM REC CHROMA OUT
BUFFER & SW
1.6M L.P.F
4
REC OUT
REC
SYNC GATE
REC SYNC GATE
REC
Q1201
30
EQ
2
1/4
REC
PB
PB
SECAM REC C ADJ.
6
REC EE 5V
PB 5V
REC
PB
1
5
REC
PB
X2
L1501,C1512
17
SPURIOUS TRAP
16
REC
X2
PB
XF151(2/2)
8
4.43MHZ B.P.F.
3
27
28
LIMITER AMP
SYNC-GATE
PB
SYNC GATE
XF152 Q1501
25
4.43MHZ B.P.F
20
REC
PB
PB BELL-AMP.
21
9
PB
14
PB 5V
L1502,L1503 C1521-C1524
Q1505
PB C IN (CP-1 VIDEO)
PB CHROMA IN (ENVELOPE IN)
L.P.F
AMP
11
PB IN
13
XF154
EQ TRANS.
XF153
BELL FILTER

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

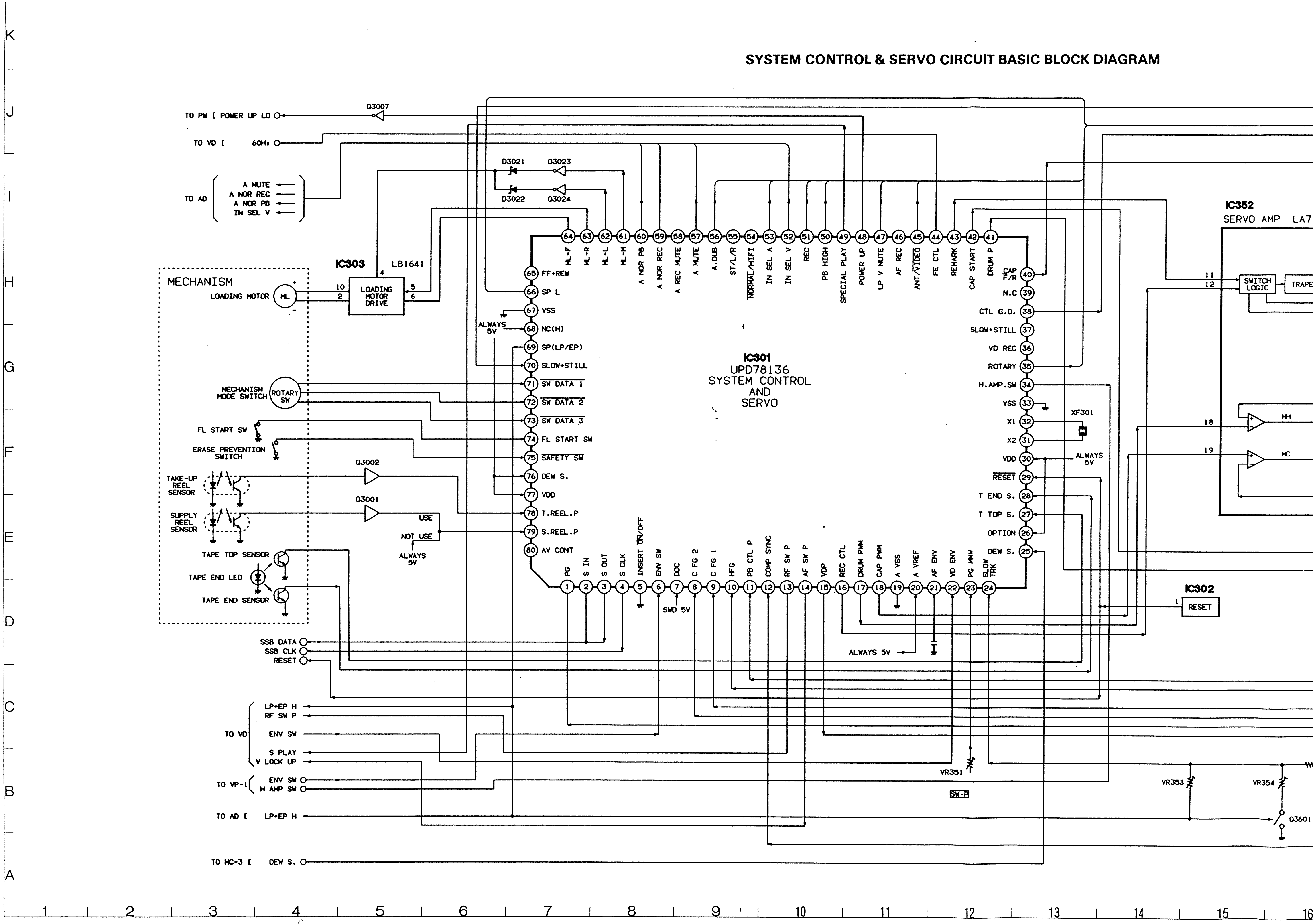
AUDIO CIRCUIT BASIC BLOCK DIAGRAM


(AD-1 BOARD)
Q2041 R2043
AUDIO INPUT SIGNAL
PB EQ
IC201 (LA7295)
) LINE IN
Q2101
Q2103
Q2102
AUDIO IN
PUT SEL V
ISM BLOCK
17
13
LP:ON
EP
15
21
EQUALIZE AMP
LPF & PB LEVEL
25
EE MUTE
ALC
ALC DET
27
C2009,R2009
ATTACK RECOVERY TIME CR
REC EE
23
PB MUTE
PB
PB/EE
29
R2010,R2011
ALC LEVEL
30
POWER ON/OFF MUTE
LINE AMP
AUDIO OUTPUT (RF MODU)
AUDIO OUTPUT
MUTING CONTROL
12
AD MUTE
REC/EE
EE
PB
REC
9
R2001
(+) BIAS (-)
4
3
REC/EE
0 HEAD
PB/EE
PB
REC
EE
REC MUTE
24
R2013 R2012
REC LEVEL
REC AMP
20
POWER ON/OFF MUTE
22
VR201 CURRENT BIAS ADJ
L2002 C2013 R2014
PEAKING
28
C2073
LP:ON
EP
EP CONTROL
14
LP+EP H
REC/EE CONTROL
2
REC H
PB/EE CONTROL
10
PB H
T2001 Q2001
70kHz OSC
1
RUSH CURRENT PROTECT
EE
PB
REC
RIPPLE FILTER
REC/EE
8
SWD 12V
DIO HEAD
LL HEAD
BDA1-13509/BF4N-MESY

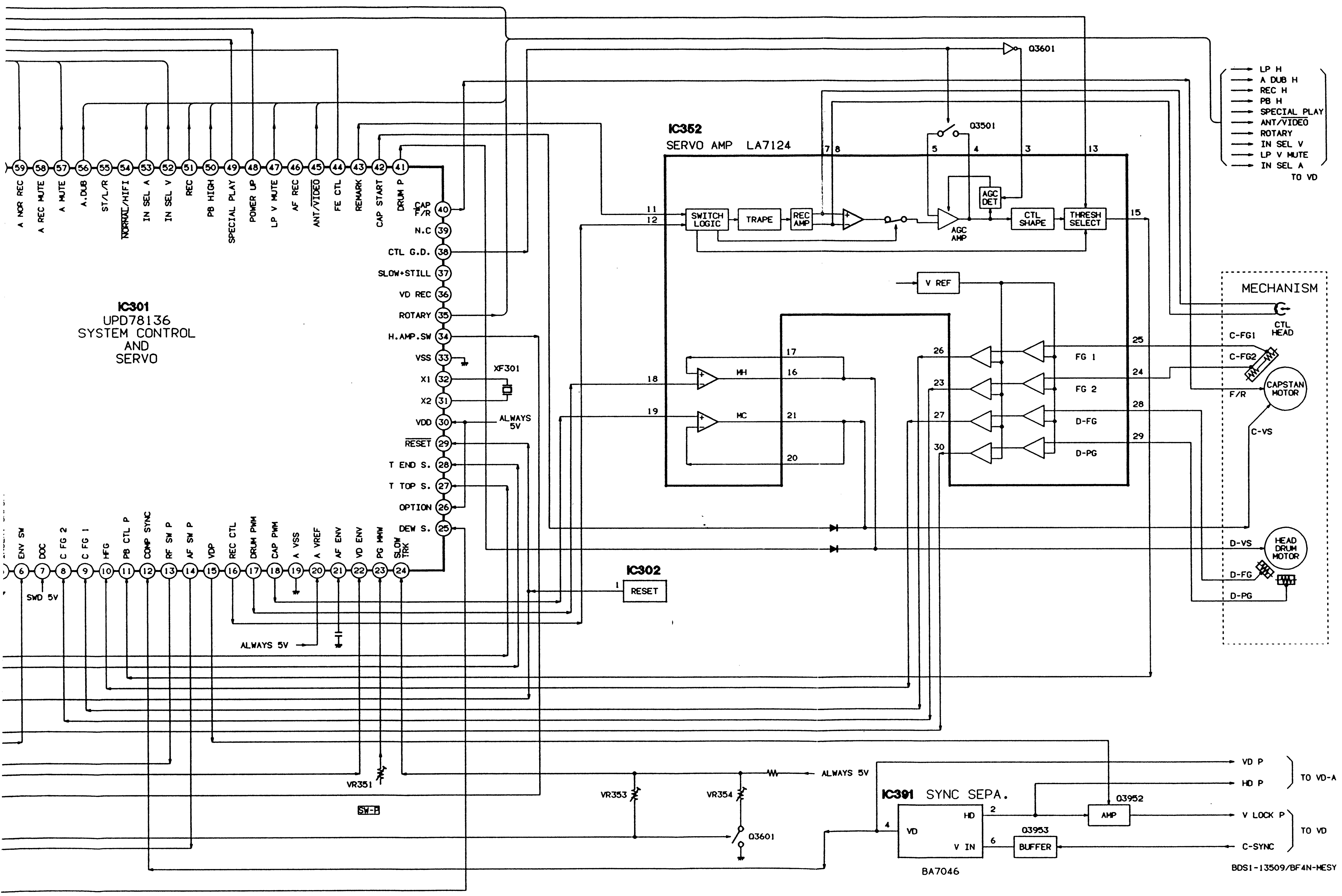
SECAM CHROMA SIGNAL PROCESS CIRCUIT BASIC BLOCK DIAGRAM (VD-2 BOARD)


GATE TIMING ADJ VR131
SWD 5V
(BA7107S) SECAM CHROMA SIGNAL PROCESS
7
22
23
REC IN (VIDEO)
SYNC GATE
SYNC GATE TIMING GENERATION
CLOCK
C.SYNC IN
C.SYNC IN (CP-1 VIDEO)
REC
E VCC
C
SYNC GATE
REC
REC SYNC GATE
Q1201
30
EQ
2
REC
1/4
REC
PB
PB
6
REC EE 5V
SYNC-GATE
REC
1
5
REC
PB
X2
L1501,C1512
17
SPURIOUS TRAP
16
X2
REC
PB
XF151(2/2)
8
4.43MHZ B.P.F.
3
27
28
LIMITER AMP
PB
SYNC GATE
XF152 Q1501
25
4.43MHZ B.P.F
20
REC
PB
PB BELL-AMP.
21
9
PB
PB OUT
10
CHROMA-OUTPUT
Q1506
BUFFER & SW
SECAM PB CHROMA
SECAM PB CHROMA OUT (CP-1 VIDEO)
SECAM H
SECAM H (CP-1 VIDEO)
B
PB
14
PB 5V
13
XF154
EQ TRANS.
XF153
BELL FILTER
Q1502
R1520
R1519
REC EE 5V
BDV3-13509/BF4N-MESY
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM


K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
TO PW [POWER UP LO
Q3007
TO VD [60Hz
D3021
Q3023
D3022
Q3024
TO AD
A MUTE
A NOR REC
A NOR PB
IN SEL V
IC303
LB1641
LOADING MOTOR DRIVE
MECHANISM
LOADING MOTOR
ML
MECHANISM MODE SWITCH
ROTARY SW
FL START SW
ERASE PREVENTION SWITCH
TAKE-UP REEL SENSOR
SUPPLY REEL SENSOR
TAPE TOP SENSOR
TAPE END LED
TAPE END SENSOR
Q3002
Q3001
USE
NOT USE
ALWAYS 5V
IC301
UPD78136
SYSTEM CONTROL AND SERVO
ML-F
ML-R
ML-L
ML-M
A NOR PB
A NOR REC
A REC MUTE
A MUTE
A.DUB
ST/L/R
NORMAL/HIFI
IN SEL A
IN SEL V
REC
PB HIGH
SPECIAL PLAY
POWER UP
LP V MUTE
AF REC
ANT/VIDEO
FE CTL
REMARK
CAP START
DRUM P
FF+REW
SP L
VSS
NC(H)
SP(LP/EP)
SLOW+STILL
SW DATA 1
SW DATA 2
SW DATA 3
FL START SW
SAFETY SW
DEW S.
VDD
T.REEL.P
S.REEL.P
AV CONT
CAP F/R
N.C
CTL G.D.
SLOW+STILL
VD REC
ROTARY
H.AMP.SW
VSS
X1
X2
VDD
RESET
T END S.
T TOP S.
OPTION
DEW S.
XF301
PG
S IN
S OUT
S CLK
INSERT ON/OFF
ENV SW
DOC
C FG 2
C FG 1
HFG
PB CTL P
COMP SYNC
RF SW P
AF SW P
VDP
REC CTL
DRUM PWM
CAP PWM
A VSS
A VREF
AF ENV
VD ENV
PG MMV
SLOW TRK
SWD 5V
IC302
RESET
IC352
SERVO AMP LA7
SWITCH LOGIC
TRAPE
MH
MC
SSB DATA
SSB CLK
RESET
TO VD
LP+EP H
RF SW P
ENV SW
S PLAY
V LOCK UP
TO VP-1
ENV SW
H AMP SW
TO AD [LP+EP H
TO MC-3 [DEW S.
VR351
SW-P
VR353
VR354
Q3601

SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM


IC301
UPD78136
SYSTEM CONTROL
AND
SERVO
A NOR REC 59
A REC MUTE 58
A MUTE 57
A.DUB 56
ST/L/R 55
NORMAL/HIFI 54
IN SEL A 53
IN SEL V 52
REC 51
PB HIGH 50
SPECIAL PLAY 49
POWER UP 48
LP V MUTE 47
AF REC 46
ANT/VIDEO 45
FE CTL 44
REMARK 43
CAP START 42
DRUM P 41
CAP F/R 40
N.C 39
CTL G.D. 38
SLOW+STILL 37
VD REC 36
ROTARY 35
H.AMP.SW 34
VSS 33
X1 32
X2 31
VDD 30
RESET 29
T END S. 28
T TOP S. 27
OPTION 26
DEW S. 25
ENV SW 6
DOC 7
C FG 2 8
C FG 1 9
HFG 10
PB CTL P 11
COMP SYNC 12
RF SW P 13
AF SW P 14
VDP 15
REC CTL 16
DRUM PWM 17
CAP PWM 18
A VSS 19
A VREF 20
AF ENV 21
VD ENV 22
PG MMV 23
SLOW TRK 24
SWD 5V
XF301
ALWAYS 5V
IC302
RESET
ALWAYS 5V
VR351
SW-B
VR353
VR354
Q3601
ALWAYS 5V
IC352
SERVO AMP LA7124
SWITCH LOGIC
TRAPE
REC AMP
AGC AMP
AGC DET
CTL SHAPE
THRESH SELECT
V REF
MH
MC
FG 1
FG 2
D-FG
D-PG
Q3601
Q3501
LP H
A DUB H
REC H
PB H
SPECIAL PLAY
ANT/VIDEO
ROTARY
IN SEL V
LP V MUTE
IN SEL A
TO VD
MECHANISM
CTL HEAD
C-FG1
C-FG2
F/R
CAPSTAN MOTOR
C-VS
D-VS
HEAD DRUM MOTOR
D-FG
D-PG
IC391 SYNC SEPA.
VD
HD
V IN
BA7046
Q3953
BUFFER
Q3952
AMP
VD P
HD P
TO VD-A
V LOCK P
C-SYNC
TO VD
BDS1-13509/BF4N-MESY

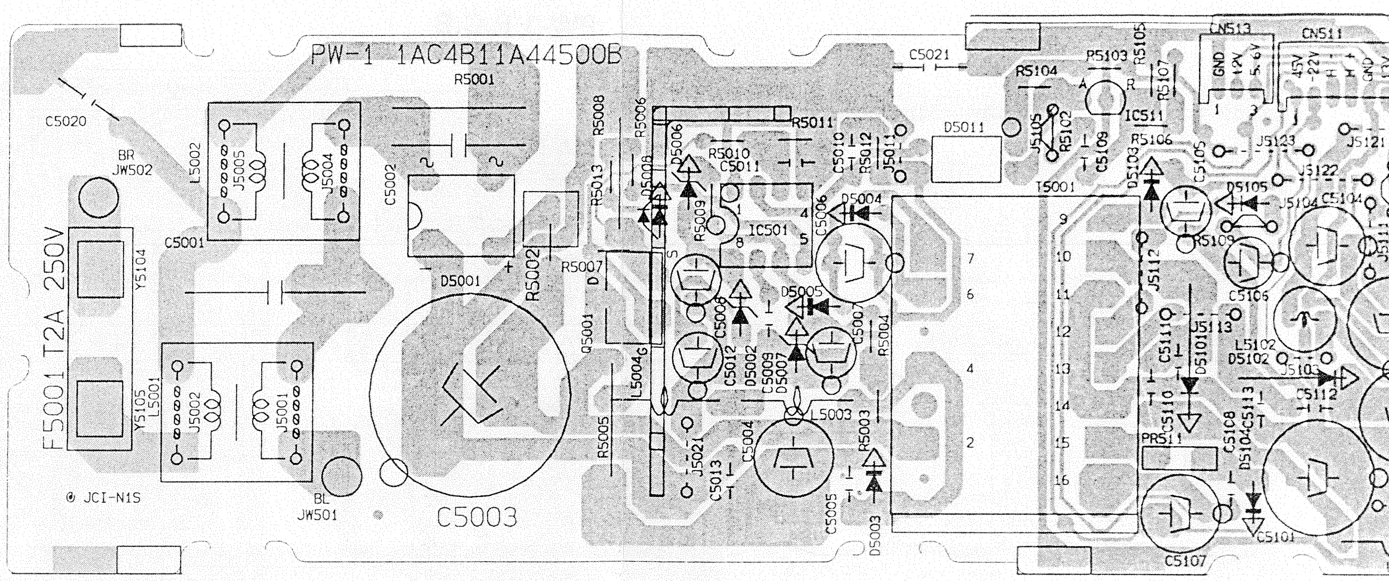
SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

NOTES:
1. All resistance values in "OHMS" unless otherwise noted. (K = 1,000 M = 1,000,000)
2. All capacitance values in "μfd" unless otherwise noted.
   p = pico farad
3. All inductance values in "mH" unless otherwise noted. μ = micro henry

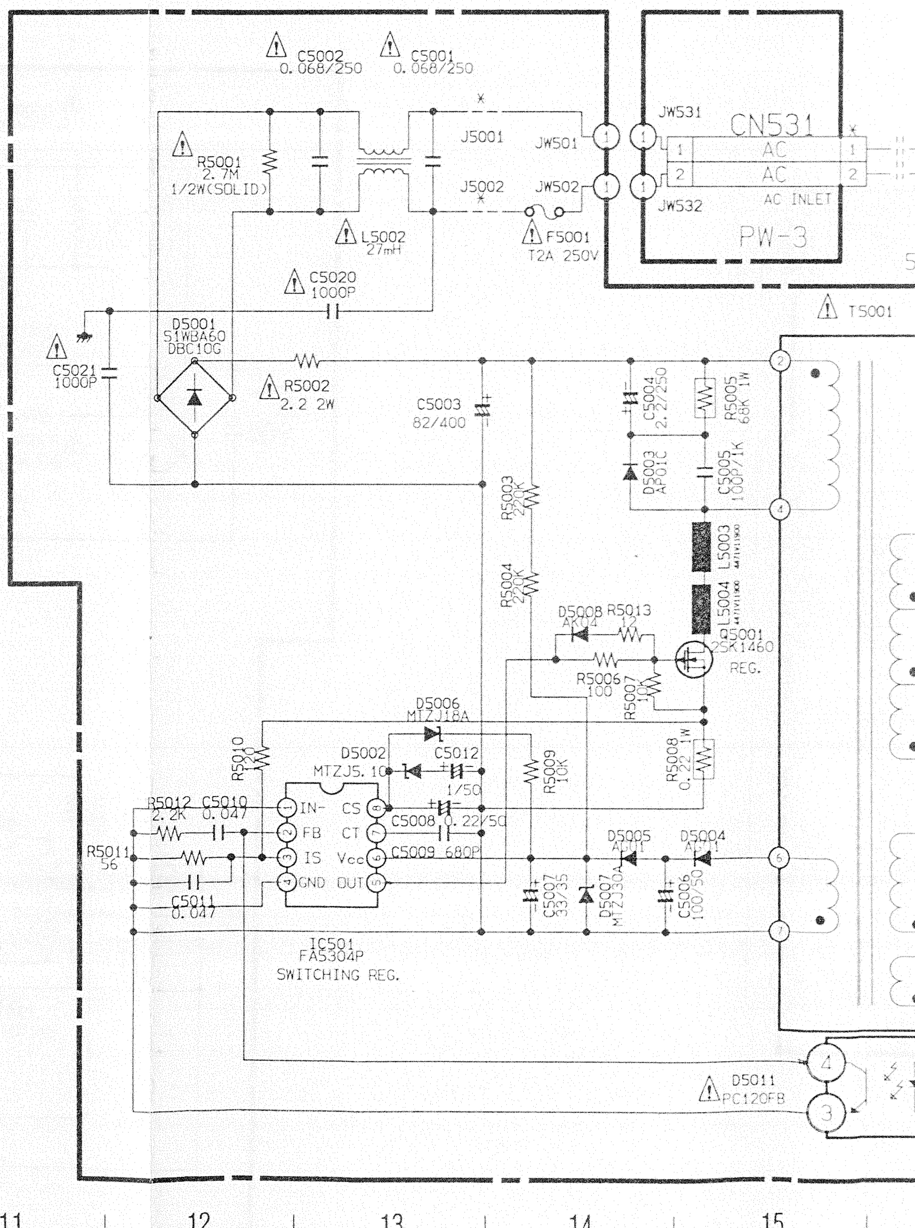
PRODUCT SAFETY NOTICE

THE COMPONENTS DESIGNATED BY A SYMBOL (⚠) IN THIS SCHEMATIC DIAGRAM DESIGNATES COMPONENTS WHOSE VALUE ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. SHOULD ANY COMPONENT DESIGNATED BY A SIMBOL NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST. DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

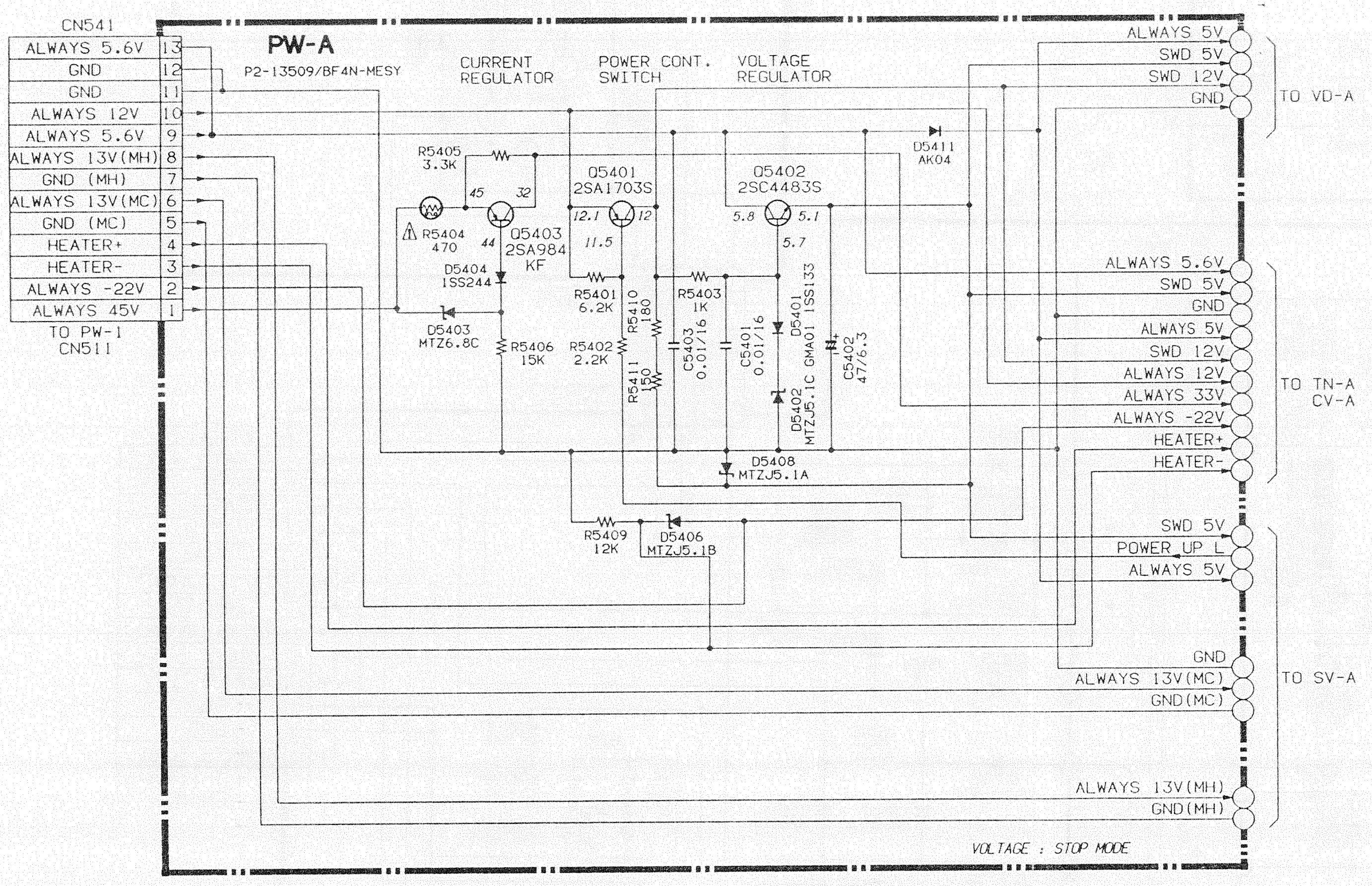
PW-1 P.C.B.


PW-1 1AC4B11A44500B
F5001 T2A 250V
C5020
BR JW502
L5002
J5005
J5004
C5002
C5001
Y5104
Y5105
L5001
J5002
J5001
BL JW501
C5003
JCI-N1S
R5001
R5002
R5007
D5001
R5008
R5013
R5006
D5006
R5009
R5010
C5011
IC501
R5011
C5010
R5012
C5006
D5004
D5005
C5007
R5004
R5003
D5003
C5005
C5004
C5013
J5021
L5003
C5012
D5002
C5009
D5007
C5008
R5005
C5021
D5011
T5001
R5104
R5103
IC511
R5106
CN513
CN511
C5107
C5101
C5108
C5110
C5111
C5112
C5106
L5102
D5102
PRS11

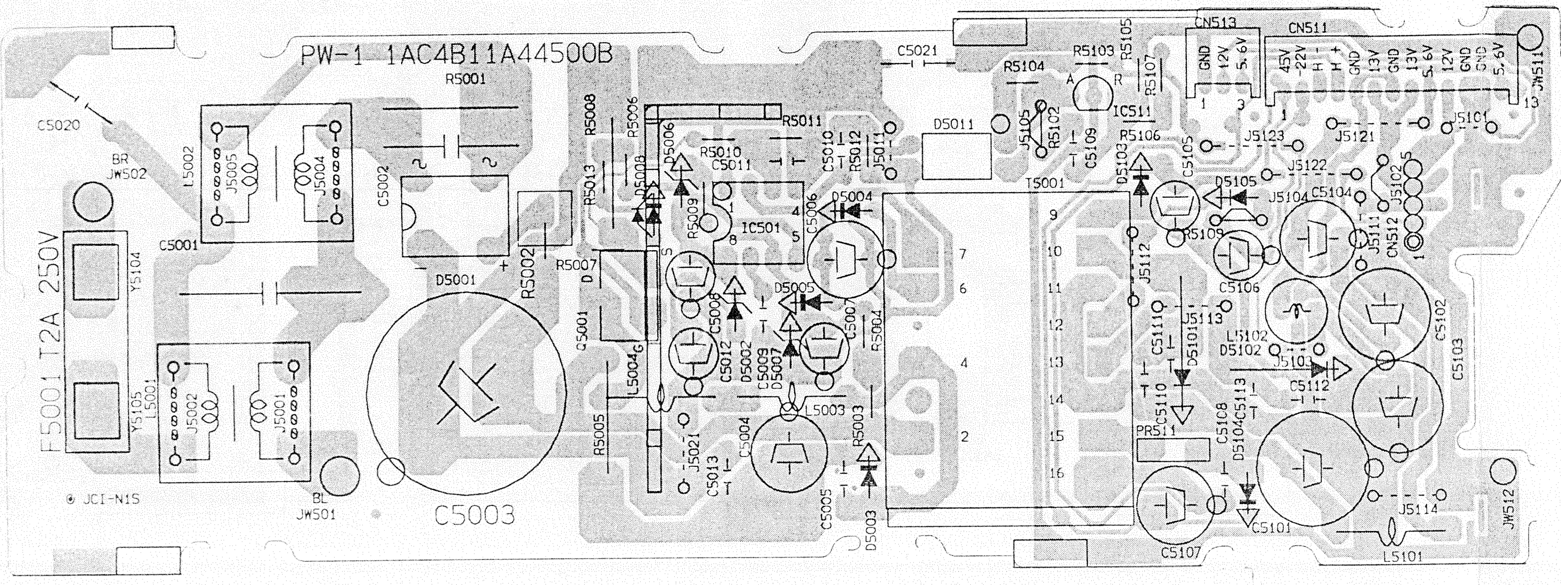
PW-1, 2, 3 BOARD PO


C5002 0.068/250
C5001 0.068/250
R5001 2.7M 1/2W(SOLID)
J5001
J5002
JW501
JW502
JW531
JW532
CN531
AC
AC INLET
PW-3
L5002 27mH
F5001 T2A 250V
C5020 1000P
D5001 S1WBA60 DBC10G
C5021 1000P
R5002 2.2 2W
C5003 82/400
T5001
C5004 2.2/250
R5005 68K 1W
D5003
C5005 100P/1K
L5003
L5004
R5003 220K
R5004 220K
D5008
R5013
R5006 100
R5007 1K
Q5001 2SK1460 REG.
D5006 MTZJ18A
R5010
D5002 MTZJ5.1C
C5012 1/50
R5009 10K
R5008 0.22 1W
R5012 2.2K
C5010 0.047
R5011 56
IN- CS
FB CT
IS Vcc
GND OUT
C5008 0.22/50
C5009 680P
C5011 0.047
IC501 FA5304P SWITCHING REG.
D5005
D5004
C5007 33/35
D5007 MTZJ30A
C5006 100/50
D5011 PC120FB

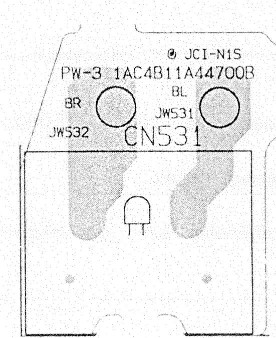
CP-1 BOARD (PW-A) POWER SUPPLY CIRCUIT DIAGRAM


CN541
ALWAYS 5.6V 13
GND 12
GND 11
ALWAYS 12V 10
ALWAYS 5.6V 9
ALWAYS 13V(MH) 8
GND (MH) 7
ALWAYS 13V(MC) 6
GND (MC) 5
HEATER+ 4
HEATER- 3
ALWAYS -22V 2
ALWAYS 45V 1
TO PW-1 CN511
PW-A
P2-13509/BF4N-MESY
CURRENT REGULATOR
POWER CONT. SWITCH
VOLTAGE REGULATOR
R5405 3.3K
R5404 470
Q5403 2SA984 KF
D5404 1SS244
D5403 MTZ6.8C
R5406 15K
Q5401 2SA1703S
R5401 6.2K
R5402 2.2K
R5410 180
R5411 560
R5403 1K
C5403 0.01/16
C5401 0.01/16
Q5402 2SC4483S
D5401 1SS133
D5402 MTZJ5.1C GMA01
C5402 47/6.3
D5408 MTZJ5.1A
D5411 AK04
R5409 12K
D5406 MTZJ5.1B
ALWAYS 5V
SWD 5V
SWD 12V
GND
TO VD-A
ALWAYS 5.6V
SWD 5V
GND
ALWAYS 5V
SWD 12V
ALWAYS 12V
ALWAYS 33V
ALWAYS -22V
HEATER+
HEATER-
TO TN-A CV-A
SWD 5V
POWER UP L
ALWAYS 5V
GND
ALWAYS 13V(MC)
GND(MC)
TO SV-A
ALWAYS 13V(MH)
GND(MH)
VOLTAGE : STOP MODE

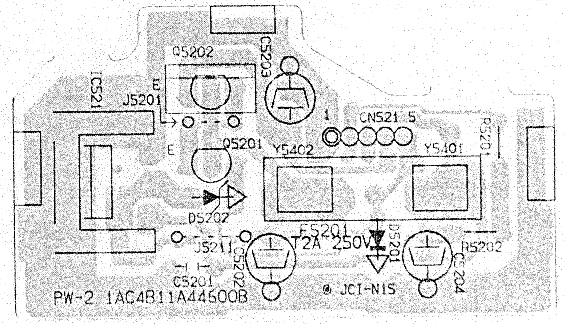
PW-1 P.C.B.


PW-1 1AC4B11A44500B
F5001 T2A 250V
C5003
D5001
T5001
CN513
CN511
IC501
IC511
JCI-N1S
JW501
JW502
JW511
JW512
L5101
C5107
C5101

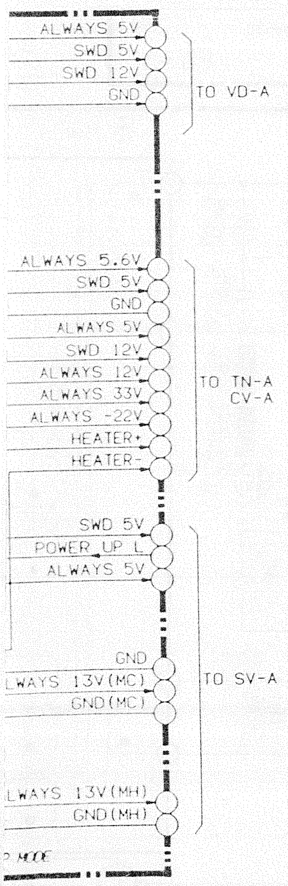
PW-3 P.C.B.

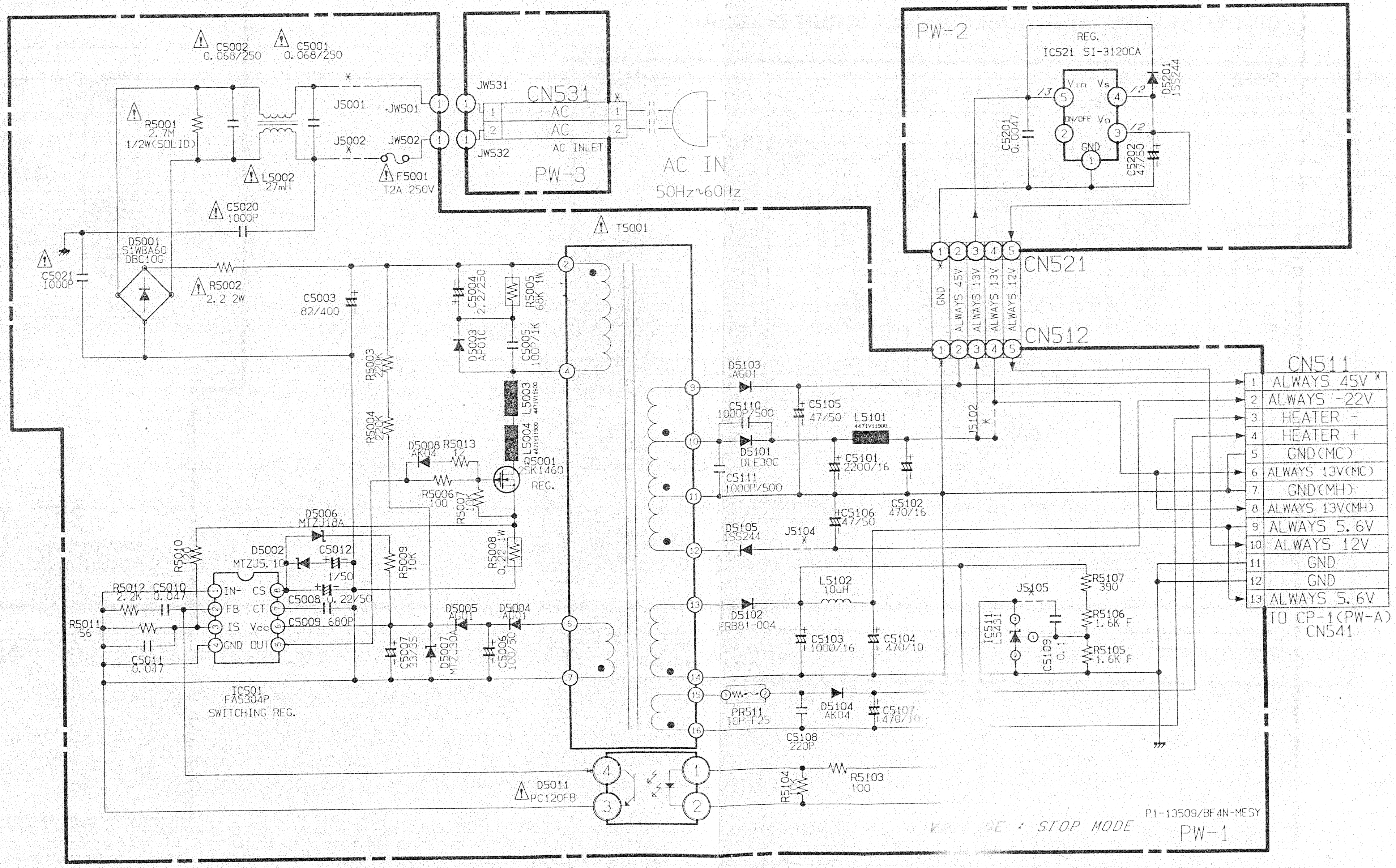

JCI-N1S
PW-3 1AC4B11A44700B
BR
BL
JW531
JW532
CN531

PW-2 P.C.B.


Q5202
IC521
CN521
YS402
YS401
D5202
F5201
T2A 250V
C5201
R5202
PW-2 1AC4B11A44600B
JCI-N1S

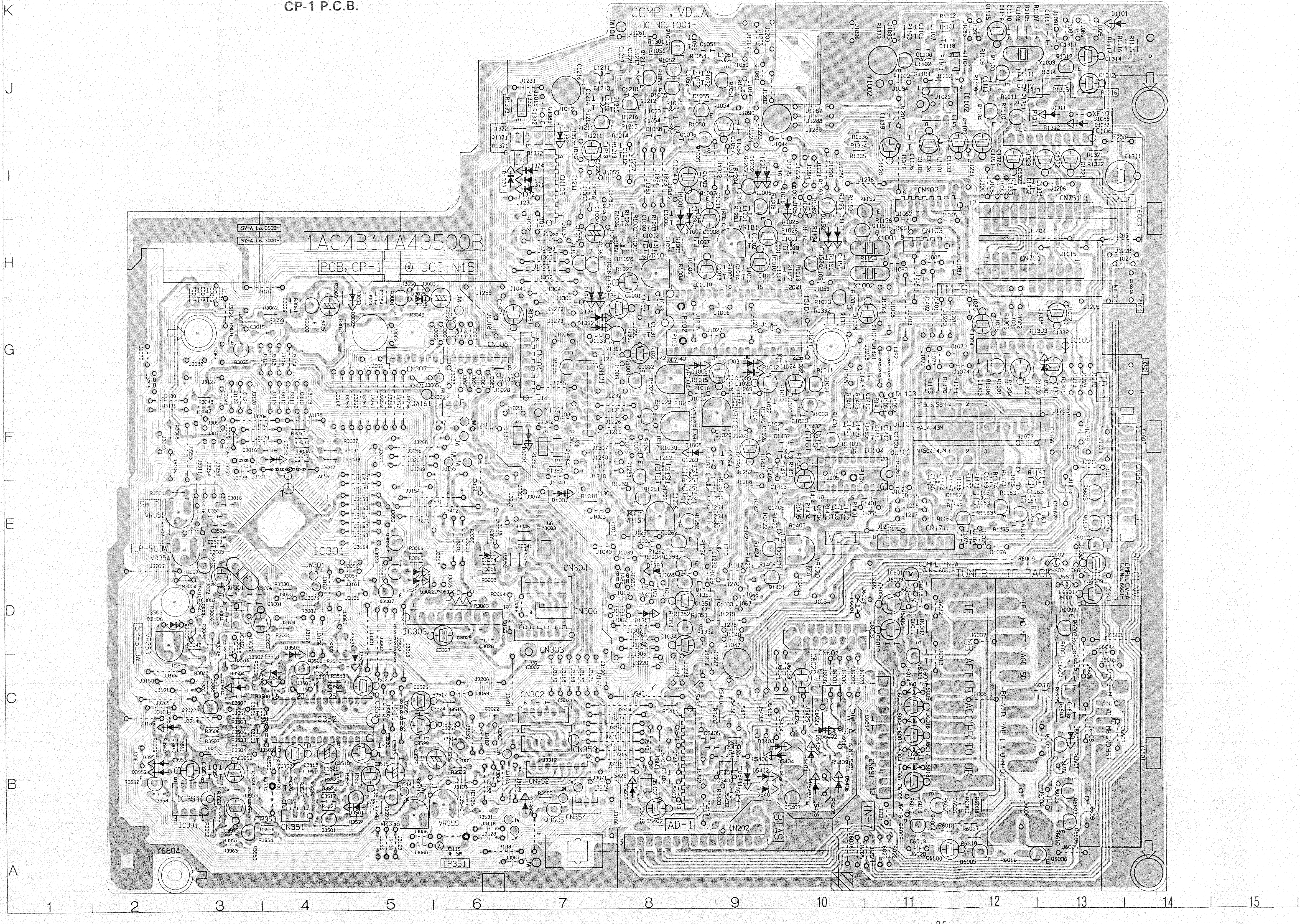
PW-1, 2, 3 BOARD POWER SUPPLY CIRCUIT DIAGRAM


ALWAYS 5V
SWD 5V
SWD 12V
GND
TO VD-A
ALWAYS 5.6V
SWD 5V
GND
ALWAYS 5V
SWD 12V
ALWAYS 12V
ALWAYS 33V
ALWAYS -22V
HEATER
HEATER
TO TN-A
CV-A
SWD 5V
POWER UP L
ALWAYS 5V
GND
LWAYS 13V(MC)
GND(MC)
TO SV-A
LWAYS 13V(MH)
GND(MH)

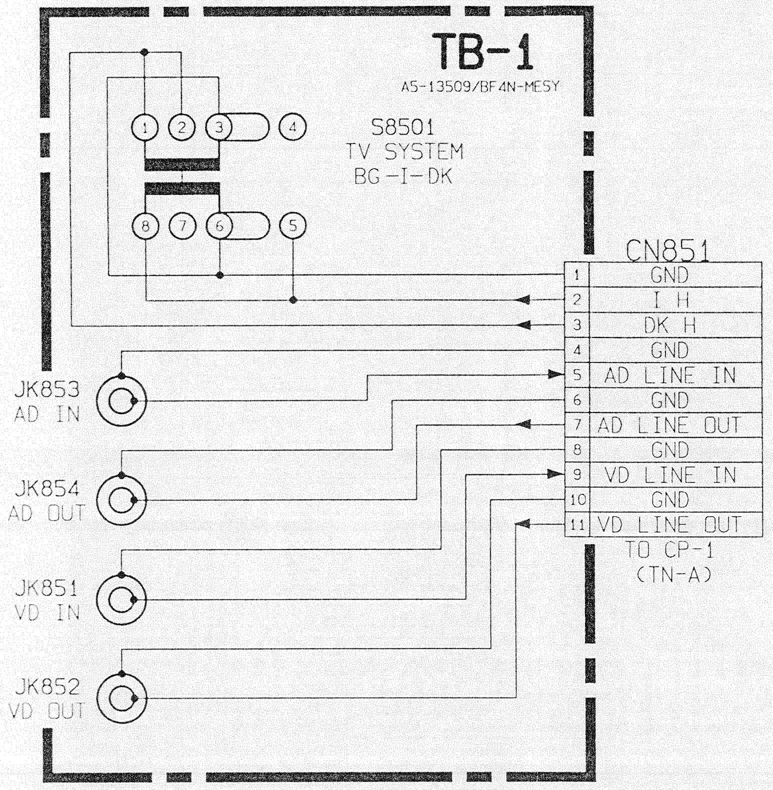

C5002 0.068/250
C5001 0.068/250
R5001 2.7M 1/2W(SOLID)
J5001
J5002
JW501
JW502
L5002 27mH
F5001 T2A 250V
JW531
JW532
CN531
AC
AC
AC INLET
PW-3
AC IN
50Hz~60Hz
C5020 1000P
C5021 1000P
D5001 S1WBA60 DBC10C
R5002 2.2 2W
C5003 82/400
T5001
C5004 2.2/250
R5005 68K 1W
D5003 AG01
C5005 100P/1K
R5003 220K
R5004 220K
L5003
L5004
Q5001 2SK1460 REG.
D5008
R5013
R5006 100
R5007
R5008 0.22 1W
D5006 MTZJ18A
D5002 MTZJ5.1C
C5012 1/50
R5010
R5009 10K
R5012 2.2K
C5010 0.047
R5011 56
C5011 0.047
C5008 0.22/50
C5009 680P
C5007 33/35
D5007 MTZJ30A
D5005 AP01
D5004 AP01
C5006 100/50
IC501 FA5304P SWITCHING REG.
IN- FB IS GND
CS CT Vcc OUT
D5011 PC120FB
D5103 AG01
C5110 1000P/500
C5105 47/50
L5101
D5101 DLE30C
C5101 2200/16
C5111 1000P/500
C5102 470/16
D5105 1SS244
J5104
C5106 47/50
L5102 10uH
D5102 ERB81-004
C5103 1000/16
C5104 470/10
PR511 ICP-F25
D5104 AK04
C5107 470/10
C5108 220P
J5105
IC511 LS431
C5109 0.1
R5107 390
R5106 1.6K F
R5105 1.6K F
R5104 1K
R5103 100
J5102
PW-2
REG. IC521 SI-3120CA
Vin Vo
ON/OFF
GND
D5201 1SS244
C5201 0.0047
C5202 47/50
CN521
GND
ALWAYS 45V
ALWAYS 13V
ALWAYS 13V
ALWAYS 12V
CN512
CN511
1 ALWAYS 45V
2 ALWAYS -22V
3 HEATER -
4 HEATER +
5 GND(MC)
6 ALWAYS 13V(MC)
7 GND(MH)
8 ALWAYS 13V(MH)
9 ALWAYS 5.6V
10 ALWAYS 12V
11 GND
12 GND
13 ALWAYS 5.6V
TO CP-1(PW-A) CN541
P1-13509/BF4N-MESY
VOLTAGE : STOP MODE
PW-1

8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23

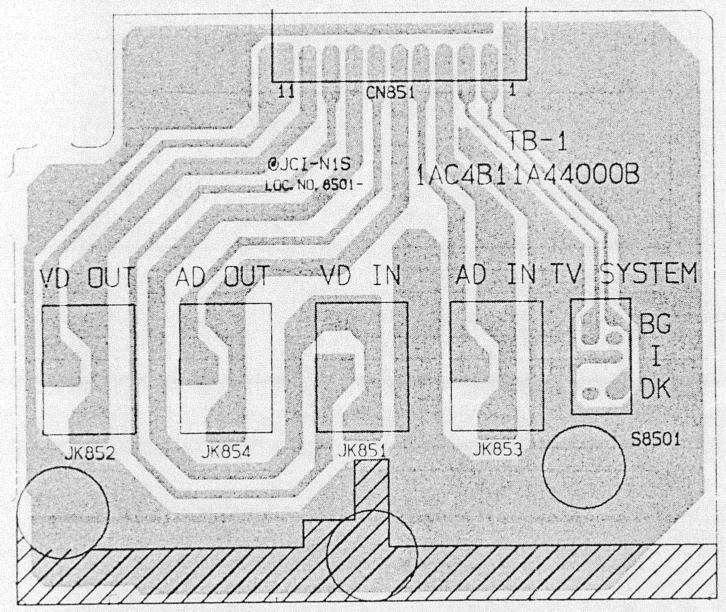
CP-1 P.C.B.


K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
COMPL. VD_A
LOC-NO. 1001-
1AC4B11A43500B
PCB, CP-1
JCI-N1S
SV-A Lo. 3500-
SY-A Lo. 3000-
IC301
IC303
IC352
IC391
IC101
IC102
IC104
IC105
CN302
CN303
CN304
CN306
CN307
CN309
CN351
CN352
CN354
CN202
CN102
CN103
CN171
CN751
CN791
CN601
CN691
TUNER IF-PACK
COMPL. IN-A
VD-1
TM-9
TM-5
AD-1
BIAS
DW-A
IN-7
SW-P
LP-SLOW
SP-SLOW
VR351
VR354
VR353
VR355
VR356
TP351
TP353
Y6604
X1001
X1002
Y1001
DL101
DL102
DL103
NTSC3.58M
PAL4.43M
NTSC4.43M

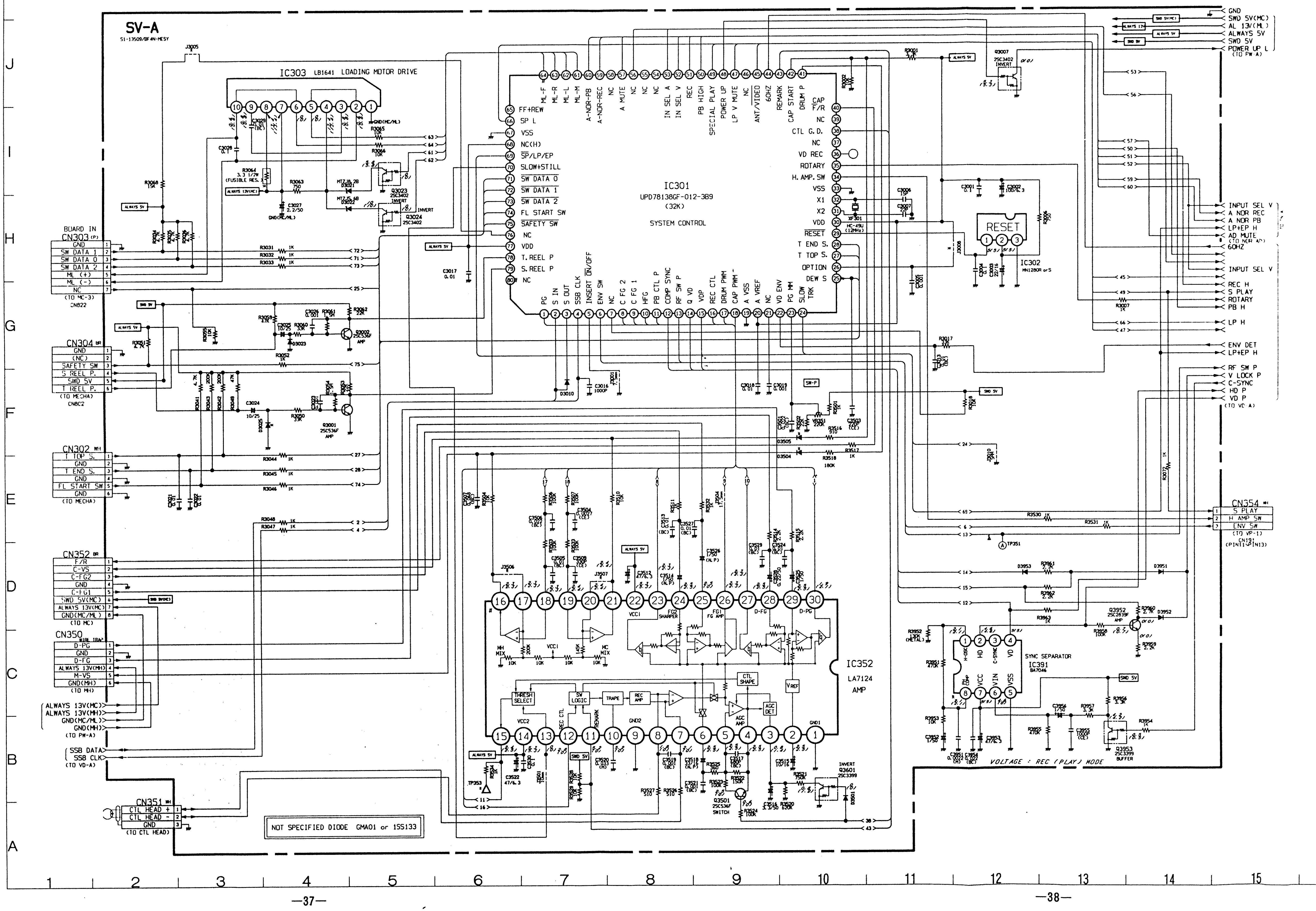
TB-1 BOARD TERMINAL CIRCUIT DIAGRAM


TB-1
A5-13509/BF4N-MESY
1
2
3
4
8
7
6
5
S8501
TV SYSTEM
BG -I- DK
CN851
1 GND
2 I H
3 DK H
4 GND
5 AD LINE IN
6 GND
7 AD LINE OUT
8 GND
9 VD LINE IN
10 GND
11 VD LINE OUT
TO CP-1
(TN-A)
JK853
AD IN
JK854
AD OUT
JK851
VD IN
JK852
VD OUT

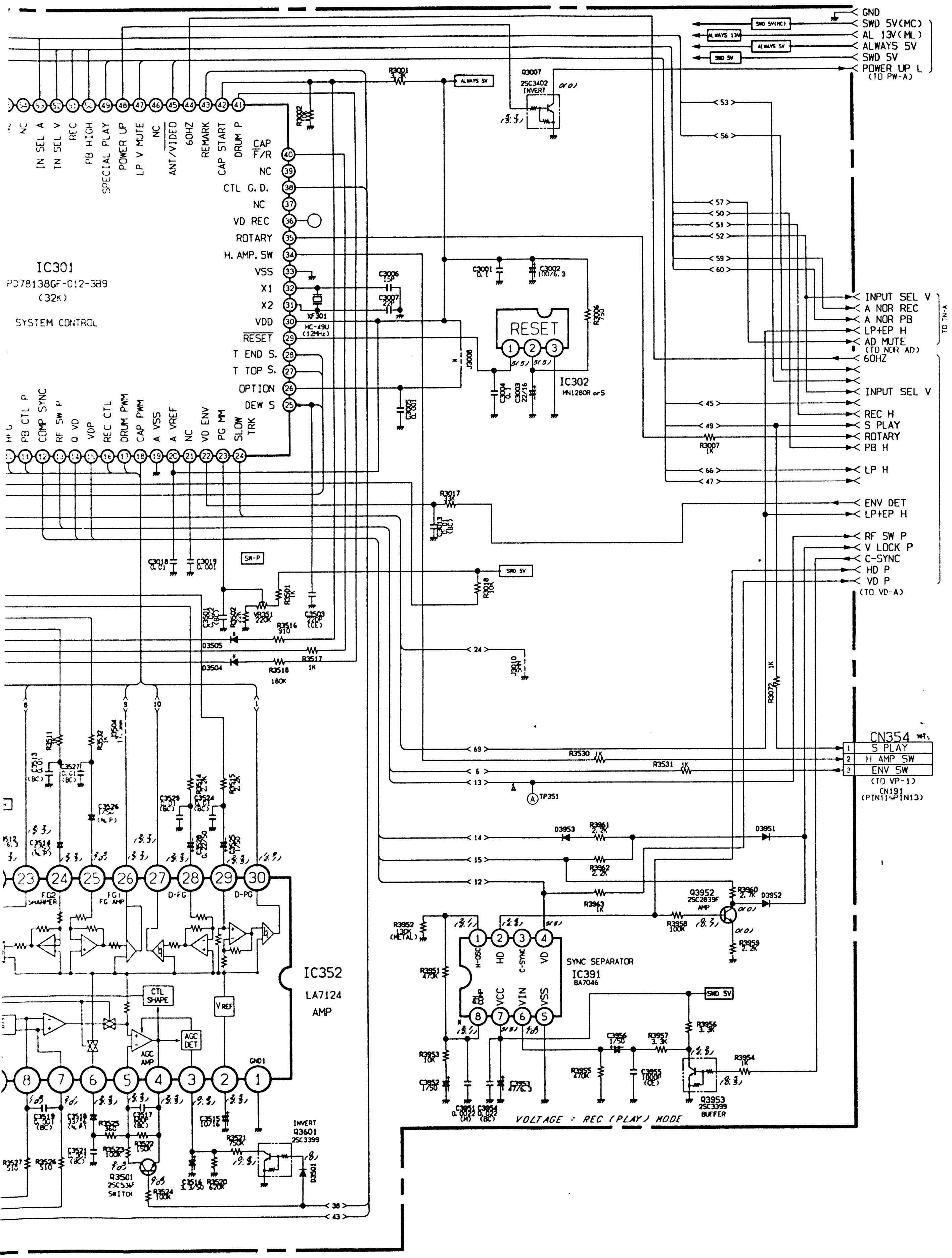
TB-1 P.C.B.


11
CN851
1
TB-1
@JCI-N1S
LOC.NO.8501-
1AC4B11A44000B
VD OUT
AD OUT
VD IN
AD IN
TV SYSTEM
BG
I
DK
JK852
JK854
JK851
JK853
S8501

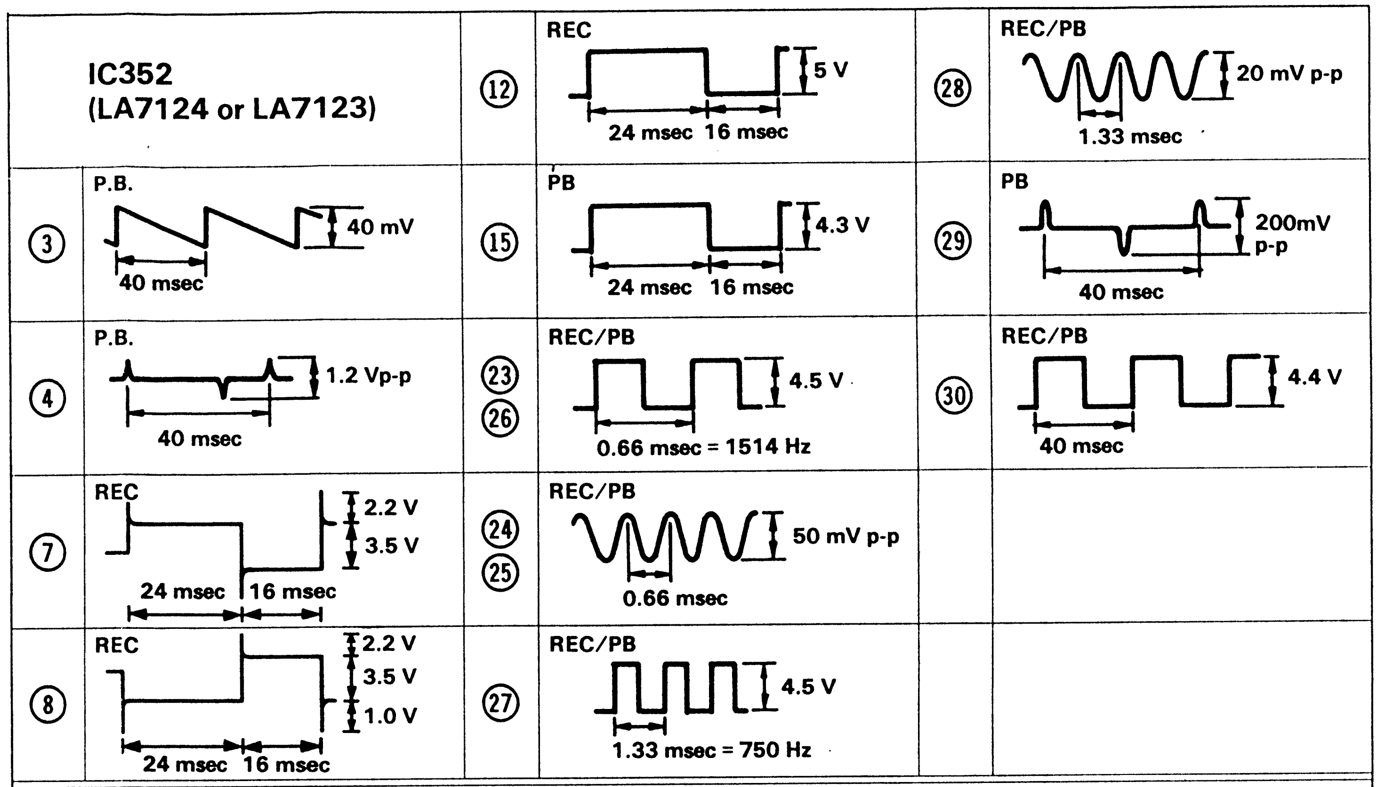
CP-1 BOARD (SV-A) SYSTEM CONTROL & SERVO CIRCUIT DIAGRAM


SV-A
S1-13509/BF4N-MESY
IC303 LB1641 LOADING MOTOR DRIVE
IC301
UPD78138GF-012-3B9
(32K)
SYSTEM CONTROL
IC302
MN1280R or S
RESET
IC352
LA7124
AMP
SYNC SEPARATOR
IC391
BA7046
BOARD IN
CN303
GND
SW DATA 1
SW DATA 0
SW DATA 2
ML (+)
ML (-)
NC
(TO MC-3)
CN822
CN304
GND
(NC)
SAFETY SW
S REEL P.
SWD 5V
T REEL P.
(TO MECHA)
CN802
CN302
T TOP S.
GND
T END S.
GND
FL START SW
GND
(TO MECHA)
CN352
F/R
C-VS
C-FG2
GND
C-FG1
SWD 5V(MC)
ALWAYS 13V(MC)
GND(MC/ML)
(TO MC)
CN350
D-PG
GND
D-FG
ALWAYS 13V(MH)
M-VS
GND(MH)
(TO MH)
ALWAYS 13V(MC)
ALWAYS 13V(MH)
GND(MC/ML)
GND(MH)
(TO PW-A)
SSB DATA
SSB CLK
(TO VD-A)
CN351
CTL HEAD +
CTL HEAD -
GND
(TO CTL HEAD)
NOT SPECIFIED DIODE GMA01 or 1SS133
GND
SWD 5V(MC)
AL 13V(ML)
ALWAYS 5V
SWD 5V
POWER UP L
(TO PW-A)
INPUT SEL V
A NOR REC
A NOR PB
LP+EP H
AD MUTE
(TO NOR AD)
60HZ
INPUT SEL V
REC H
S PLAY
ROTARY
PB H
LP H
ENV DET
LP+EP H
RF SW P
V LOCK P
C-SYNC
HD P
VD P
(TO VD A)
CN354
S PLAY
H AMP SW
ENV SW
(TO VP-1)
CN101
(PIN11-PIN13)
FF+REW
SP L
VSS
NC(H)
SP/LP/EP
SLOW+STILL
SW DATA 0
SW DATA 1
SW DATA 2
FL START SW
SAFETY SW
NC
VDD
T.REEL P
S.REEL P
NC
ML-F
ML-R
ML-L
ML-M
A-NOR-PB
A-NOR-REC
NC
A MUTE
NC
NC
NC
IN SEL A
IN SEL V
REC
PB HIGH
SPECIAL PLAY
POWER UP
LP V MUTE
NC
ANT/VIDEO
60HZ
REMARK
CAP START
DRUM P
CAP F/R
NC
CTL G.D.
NC
VD REC
ROTARY
H.AMP.SW
VSS
X1
X2
VDD
RESET
T END S.
T TOP S.
OPTION
DEW S
PG
S IN
S OUT
SSB CLK
INSERT ON/OFF
ENV SW
NC
C FG 2
C FG 1
HFG
PB CTL P
COMP SYNC
RF SW P
Q VD
VDP
REC CTL
DRUM PWM
CAP PWM
A VSS
A VREF
NC
VD ENV
PG MM
SLOW TRK
XF301
HC-49U
(12MHz)
Q3007
2SC3402
INVERT
Q3023
2SC3402
INVERT
Q3024
2SC3402
Q3002
2SC536F
AMP
Q3001
2SC536F
AMP
Q3501
2SC536F
SWITCH
Q3601
2SC3399
INVERT
Q3952
2SC2839F
AMP
Q3953
2SC3399
BUFFER
R3064
3.3 1/7W
(FUSIBLE RES.)
ALWAYS 5V
ALWAYS 13V(MC)
SWD 5V
SW-P
MH MIX
MC MIX
VCC1
VCC2
GND1
GND2
FG2 SHARPER
FG1 FG AMP
D-FG
D-PG
THRESH SELECT
SW LOGIC
TRAPE
REC AMP
AGC AMP
AGC DET
CTL SHAPE
VREF
REC CTL
REMARK
HD
VD
C-SYNC
H-OSC
VCC
VIN
VSS
TP351
TP353
J3005
J3006
J3506
J3507
D3010
D3505
D3504
D3951
D3953
VOLTAGE : REC (PLAY) MODE
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

L & SERVO CIRCUIT DIAGRAM


GND
SWD 5V(MC)
AL 13V(ML)
ALWAYS 5V
SWD 5V
POWER UP L
(TO PW-A)
Q3007
2SC3402
INVERT
IN SEL A
IN SEL V
REC
PB HIGH
SPECIAL PLAY
POWER UP
LP V MUTE
NC
ANT/VIDEO
60HZ
REMARK
CAP START
DRUM P
CAP F/R
NC
CTL G.D.
NC
VD REC
ROTARY
H. AMP. SW
VSS
X1
X2
VDD
RESET
T END S.
T TOP S.
OPTION
DEW S
IC301
PD78138GF-C12-3B9
(32K)
SYSTEM CONTROL
PB CTL P
COMP SYNC
RF SW P
Q VD
VDP
REC CTL
DRUM PWM
CAP PWM
A VSS
A VREF
NC
VD ENV
PG MM
SLOW TRK
RESET
IC302
MN1280R or S
XF301
HC-49U
INPUT SEL V
A NOR REC
A NOR PB
LP+EP H
AD MUTE
(TO NOR AD)
60HZ
INPUT SEL V
REC H
S PLAY
ROTARY
PB H
LP H
ENV DET
LP+EP H
RF SW P
V LOCK P
C-SYNC
HD P
VD P
(TO VD-A)
CN354
S PLAY
H AMP SW
ENV SW
(TO VP-1)
CN191
(PIN11 PIN13)
TP351
D3953
D3951
D3952
Q3952
2SC2039F
AMP
FG2 SHAPER
FG1 FG AMP
D-FG
D-PG
CTL SHAPE
VREF
AGC AMP
AGC DET
IC352
LA7124
AMP
H-OSC
HD
C-SYNC
VD
VCC
VIN
VSS
SYNC SEPARATOR
IC391
BA7046
SWD 5V
Q3953
2SC3399
BUFFER
Q3501
2SC536F
SWITCH
INVERT
Q3601
2SC3399
D3501
D3504
D3505
VOLTAGE : REC (PLAY) MODE

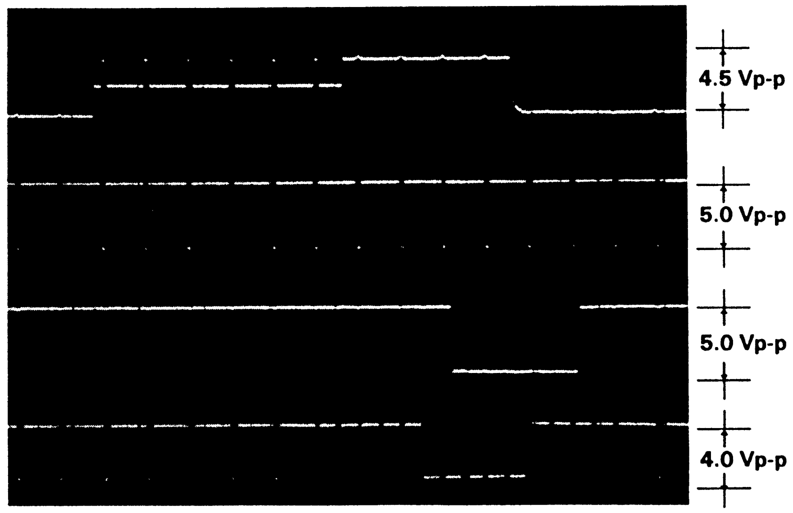
WAVEFORM OF SERVO (PAL MODE)


IC352
(LA7124 or LA7123)
⑫ REC 5 V 24 msec 16 msec
㉘ REC/PB 20 mV p-p 1.33 msec
③ P.B. 40 mV 40 msec
⑮ PB 4.3 V 24 msec 16 msec
㉙ PB 200mV p-p 40 msec
④ P.B. 1.2 Vp-p 40 msec
㉓ ㉖ REC/PB 4.5 V 0.66 msec = 1514 Hz
㉚ REC/PB 4.4 V 40 msec
⑦ REC 2.2 V 3.5 V 24 msec 16 msec
㉔ ㉕ REC/PB 50 mV p-p 0.66 msec
⑧ REC 2.2 V 3.5 V 1.0 V 24 msec 16 msec
㉗ REC/PB 4.5 V 1.33 msec = 750 Hz

V-LOCK PULSE GENERATION CIRCUIT WAVEFORM (IC391, Q3952, Q3953, D3951, D3952)

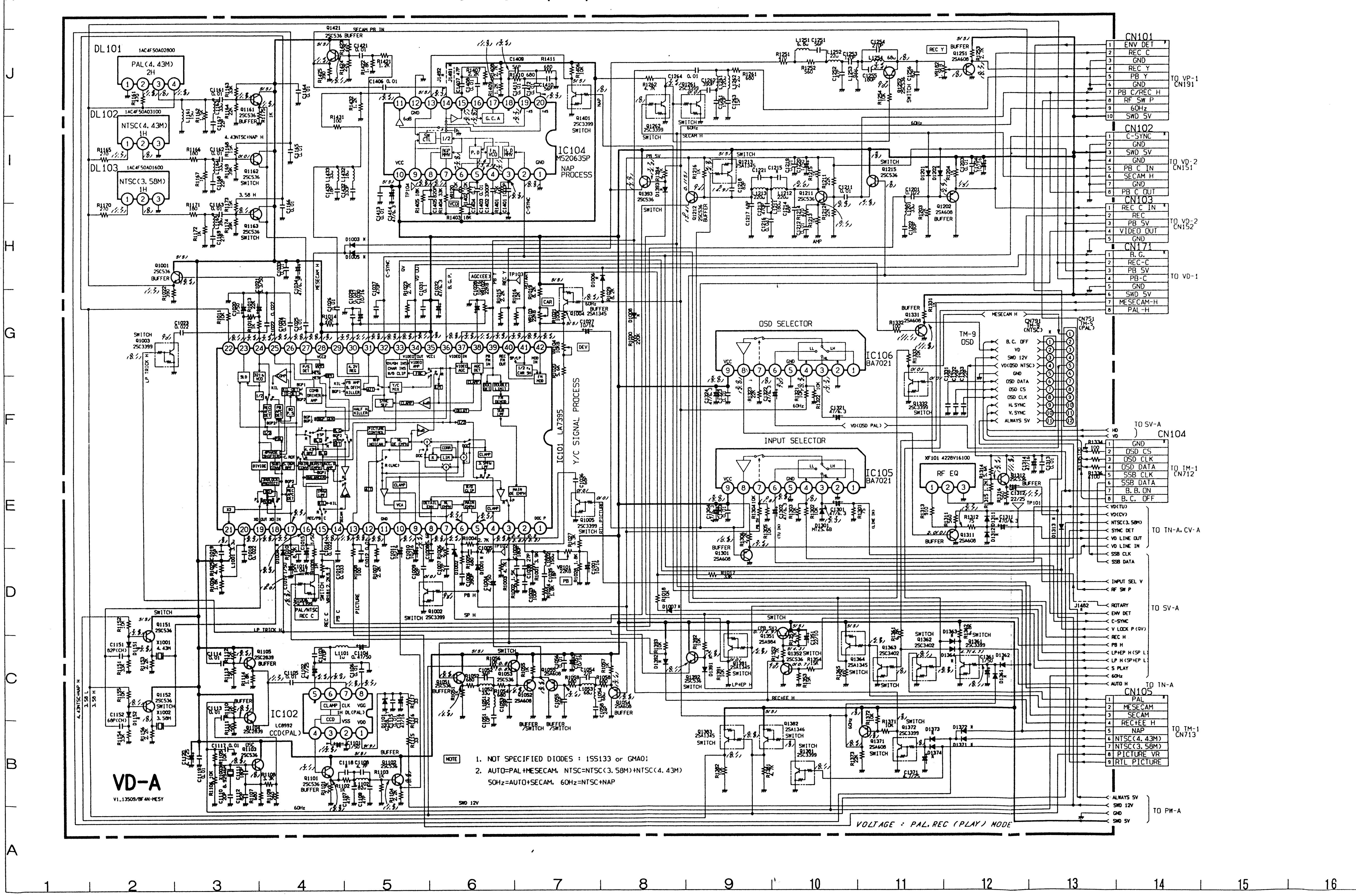
[STILL Mode]

1. V-LOCK PULSE OUTPUT
   - Cathode of D3951 and D3952
2. H-SYNC OUTPUT
   - Pin 2 of IC391
3. V-SYNC OUTPUT
   - Pin 4 of IC391
4. COMPOSITE SYNC INPUT
   - Pin 6 of IC391



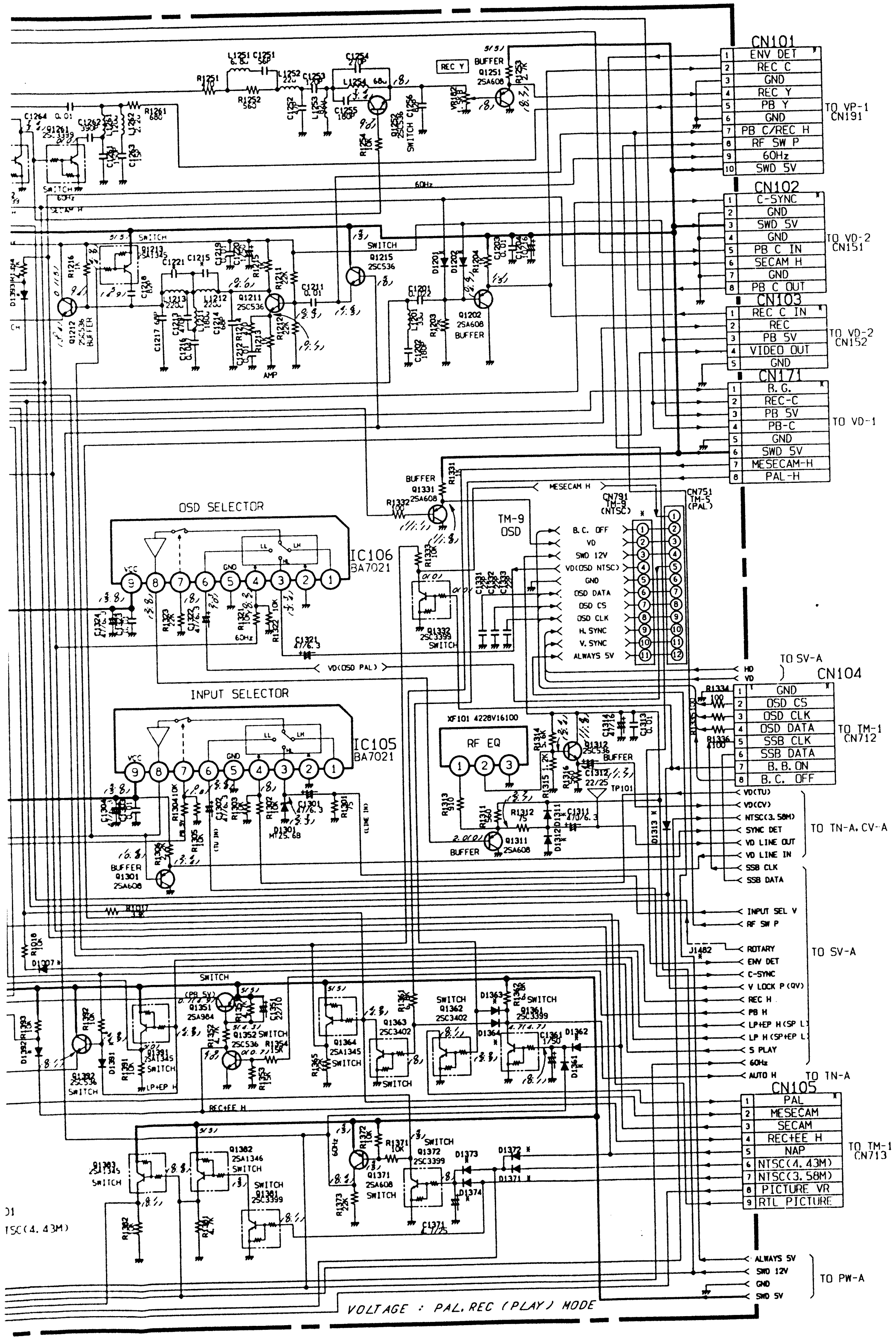
WF-S-VP

CP-1 BOARD (VD-A) VIDEO CIRCUIT DIAGRAM


VD-A
V1_13509/BF4N-MESY
DL101 1AC4F50A02800 PAL(4.43M) 2H
DL102 1AC4F50A03100 NTSC(4.43M) 1H
DL103 1AC4F50A01600 NTSC(3.58M) 1H
IC104 M52063SP NAP PROCESS
IC101 LA7395 Y/C SIGNAL PROCESS
IC102 LC8992 CCD(PAL)
IC106 BA7021 OSD SELECTOR
IC105 BA7021 INPUT SELECTOR
XF101 4228V16100 RF EQ
TM-9 OSD
CN791 TM-9 (NTSC)
CN751 TM-9 (PAL)
CN101
1 ENV DET
2 REC C
3 GND
4 REC Y
5 PB Y
6 GND
7 PB C/REC H
8 RF SW P
9 60Hz
10 SWD 5V
TO VP-1 CN191
CN102
1 C-SYNC
2 GND
3 SWD 5V
4 GND
5 PB C IN
6 SECAM H
7 GND
8 PB C OUT
TO VD-2 CN151
CN103
1 REC C IN
2 REC
3 PB 5V
4 VIDEO OUT
5 GND
TO VD-2 CN152
CN171
1 R.G.
2 REC-C
3 PB 5V
4 PB-C
5 GND
6 SWD 5V
7 MESECAM-H
8 PAL-H
TO VD-1
CN104
1 GND
2 OSD CS
3 OSD CLK
4 OSD DATA
5 SSB CLK
6 SSB DATA
7 B.B. ON
8 B.C. OFF
TO IM-1 CN712
TO SV-A
HD
VD
VD(TU)
VD(CV)
NTSC(3.58M)
SYNC DET
VD LINE OUT
VD LINE IN
SSB CLK
SSB DATA
TO TN-A, CV-A
INPUT SEL V
RF SW P
ROTARY
ENV DET
C-SYNC
V LOCK P(GV)
REC H
PB H
LP+EP H(SP L)
LP H(SP+EP L)
S PLAY
60Hz
AUTO H
TO SV-A
TO TN-A
CN105
1 PAL
2 MESECAM
3 SECAM
4 REC+EE H
5 NAP
6 NTSC(4.43M)
7 NTSC(3.58M)
8 PICTURE VR
9 RTL PICTURE
TO TM-1 CN713
ALWAYS 5V
SWD 12V
GND
SWD 5V
TO PW-A
B.C. OFF
VD
SWD 12V
VD(OSD NTSC)
GND
OSD DATA
OSD CS
OSD CLK
H.SYNC
V.SYNC
ALWAYS 5V
VD(OSD PAL)
MESECAM H
Q1421 SECAM PB IN
Q1001 2SC536 BUFFER
Q1003 2SC3399 SWITCH
Q1161 2SC536 BUFFER
Q1162 2SC536 SWITCH
Q1163 2SC536 SWITCH
Q1401 2SC3399 SWITCH
Q1004 2SA1345 BUFFER
Q1005 2SC3399 SWITCH
Q1002 SWITCH 2SC3399
Q1151 2SC536
Q1152 2SC536 SWITCH
Q1105 2SC2839 BUFFER
Q1103 2SC536
Q1101 2SC536 BUFFER
Q1102 2SC536 BUFFER
Q1251 2SA608 BUFFER
Q1262 2SC3399 SWITCH
Q1261 2SA1309 SWITCH
Q1393 2SC536
Q1212 2SC536 BUFFER
Q1211 2SC536 AMP
Q1213 2SA1345 SWITCH
Q1215 2SC536 SWITCH
Q1202 2SA608 BUFFER
Q1331 2SA608 BUFFER
Q1332 2SC3399 SWITCH
Q1312 2SC536 BUFFER
Q1311 2SA608 BUFFER
Q1301 2SA608 BUFFER
Q1392 SWITCH
Q1351 2SA984
Q1352 2SC536 SWITCH
Q1345 2SA1345 SWITCH
Q1364 2SA1345 SWITCH
Q1363 2SC3402 SWITCH
Q1362 2SC3402 SWITCH
Q1361 2SC3399 SWITCH
Q1383 2SA1345 SWITCH
Q1382 2SA1346 SWITCH
Q1381 2SC3399 SWITCH
Q1372 2SC3399 SWITCH
Q1371 2SA608 SWITCH
Q1051 BUFFER
Q1053 2SC536
Q1055 2SA608
Q1054 2SC536 BUFFER
BUFFER /SWITCH
X1001 4.43M
X1002 3.58M
LP TRICK H
PAL/NTSC REC C
PB H
SP H
SWD 12V
60Hz
REC+EE H
DEV
PB
CAR
AGC(EE)
VOLTAGE : PAL, REC (PLAY) MODE
K J I H G F E D C B A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

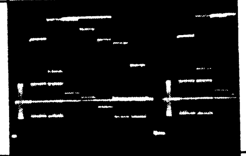
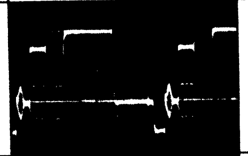
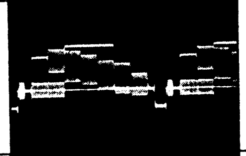
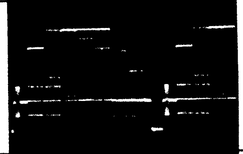
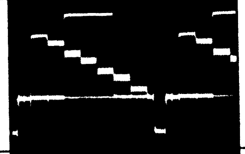
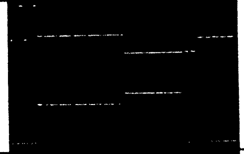
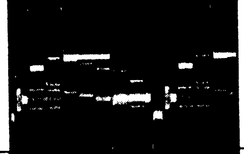
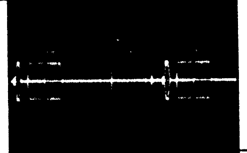
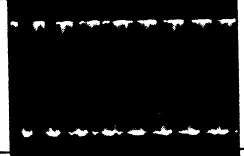
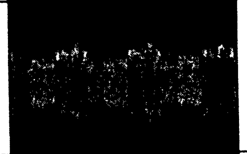
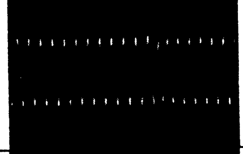
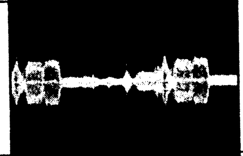
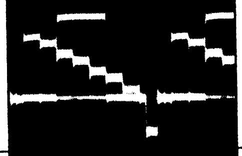
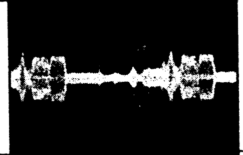
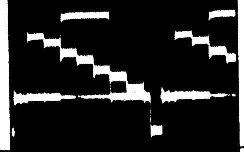
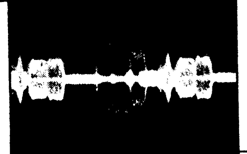
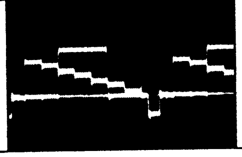
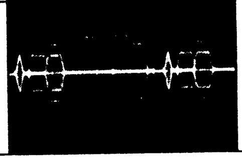
NOTE 1. NOT SPECIFIED DIODES : 1SS133 or GMA01
2. AUTO=PAL+MESECAM. NTSC=NTSC(3.58M)+NTSC(4.43M)
50Hz=AUTO+SECAM. 60Hz=NTSC+NAP

RCUIT DIAGRAM

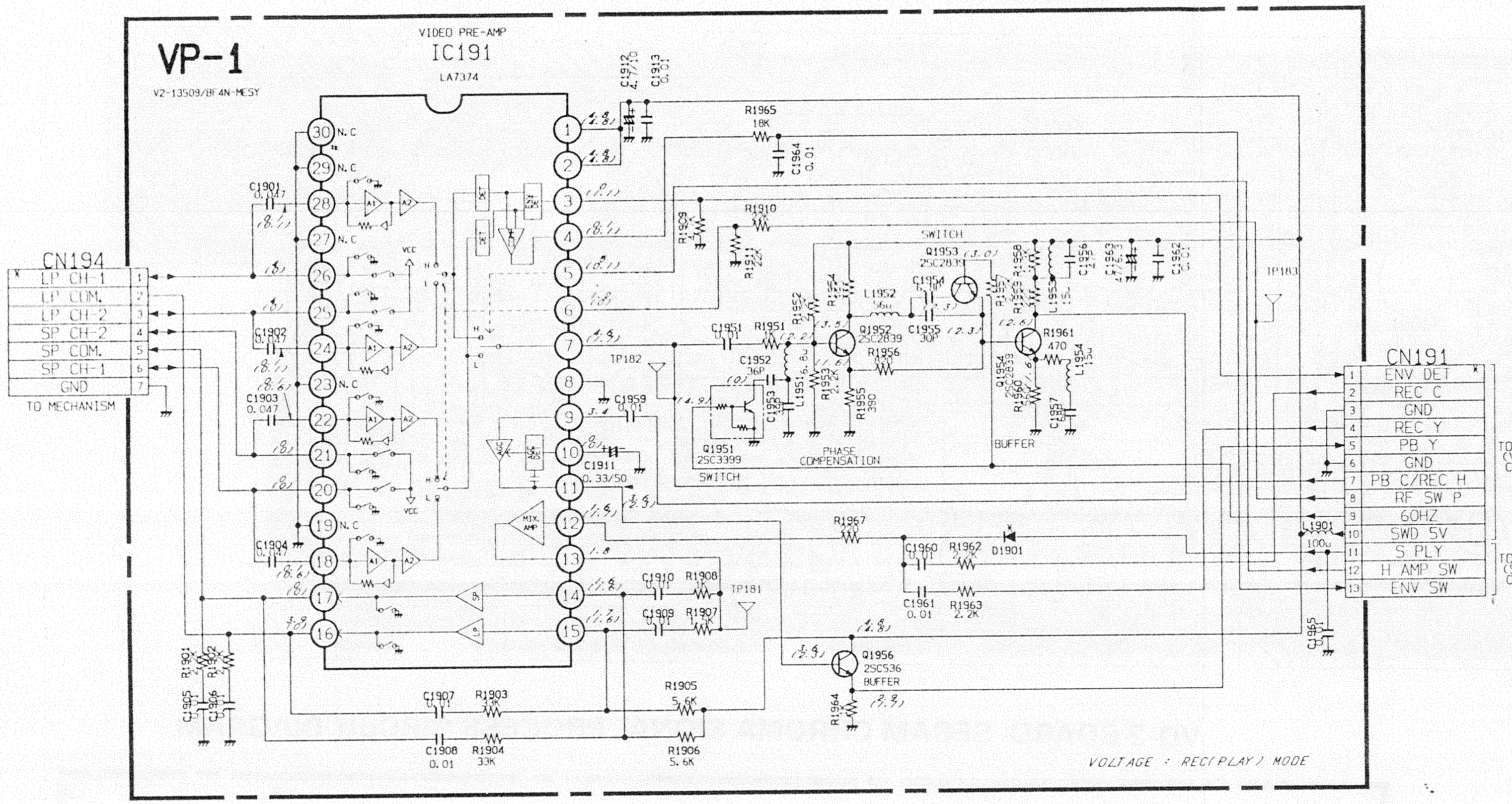

CN101
1 ENV DET
2 REC C
3 GND
4 REC Y
5 PB Y
6 GND
7 PB C/REC H
8 RF SW P
9 60Hz
10 SWD 5V
TO VP-1 CN191
CN102
1 C-SYNC
2 GND
3 SWD 5V
4 GND
5 PB C IN
6 SECAM H
7 GND
8 PB C OUT
TO VD-2 CN151
CN103
1 REC C IN
2 REC
3 PB 5V
4 VIDEO OUT
5 GND
TO VD-2 CN152
CN171
1 B.G.
2 REC-C
3 PB 5V
4 PB-C
5 GND
6 SWD 5V
7 MESECAM-H
8 PAL-H
TO VD-1
BUFFER Q1251 2SA608
SWITCH Q1215 2SC536
Q1202 2SA608 BUFFER
Q1211 2SC536
AMP
REC Y
60Hz
BUFFER Q1331 2SA608
MESECAM H
CN791 TM-9 (NTSC)
CN751 TM-5 (PAL)
TM-9 OSD
B.C. OFF
VD
SWD 12V
VD(OSD NTSC)
GND
OSD DATA
OSD CS
OSD CLK
H. SYNC
V. SYNC
ALWAYS 5V
OSD SELECTOR
IC106 BA7021
Q1332 2SC3399 SWITCH
VD(OSD PAL)
TO SV-A
HD
VD
CN104
1 GND
2 OSD CS
3 OSD CLK
4 OSD DATA
5 SSB CLK
6 SSB DATA
7 B.B.ON
8 B.C. OFF
TO TM-1 CN712
INPUT SELECTOR
IC105 BA7021
XF101 4228V16100
RF EQ
Q1312 2SC536 BUFFER
TP101
Q1311 2SA608 BUFFER
BUFFER Q1301 2SA608
VD(TU)
VD(CV)
NTSC(3.58M)
SYNC DET
VD LINE OUT
VD LINE IN
SSB CLK
SSB DATA
TO TN-A, CV-A
INPUT SEL V
RF SW P
TO SV-A
ROTARY
ENV DET
C-SYNC
V LOCK P(QV)
REC H
PB H
LP+EP H(SP L)
LP H(SP+EP L)
S PLAY
60Hz
AUTO H
TO TN-A
SWITCH Q1351 2SA984
Q1352 2SC536 SWITCH
Q1353 2SA1345 SWITCH
Q1392 2SA1534 SWITCH
Q1363 2SC3402
Q1362 2SC3402 SWITCH
Q1364 2SA1345 SWITCH
SWITCH Q1361 2SC3399
REC+EE H
CN105
1 PAL
2 MESECAM
3 SECAM
4 REC+EE H
5 NAP
6 NTSC(4.43M)
7 NTSC(3.58M)
8 PICTURE VR
9 RTL PICTURE
TO TM-1 CN713
Q1382 2SA1346 SWITCH
Q1381 2SC3399 SWITCH
Q1372 2SC3399 SWITCH
Q1371 2SA608 SWITCH
NTSC(4.43M)
ALWAYS 5V
SWD 12V
GND
SWD 5V
TO PW-A
VOLTAGE : PAL, REC (PLAY) MODE

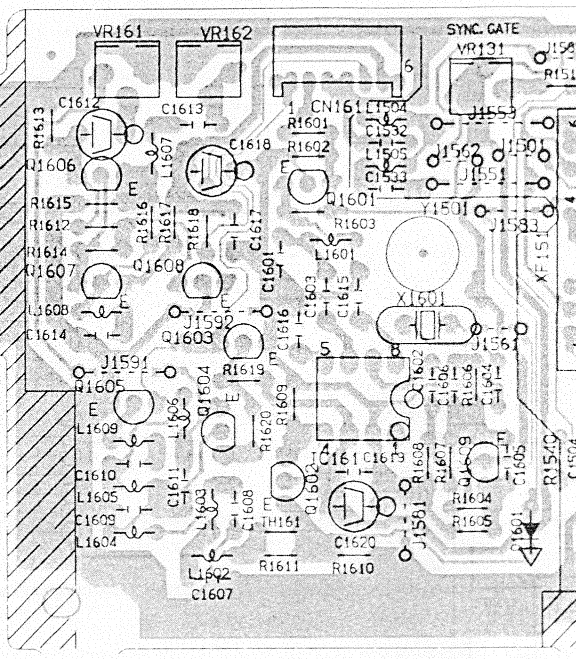
WAVEFORM OF VIDEO (PAL MODE)

WF-V-BF

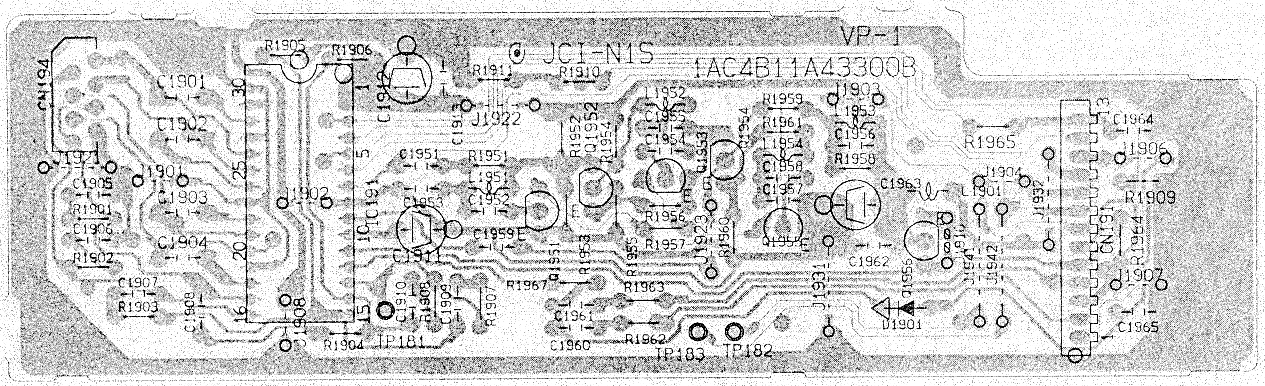
TEST LOCATION	WAVEFORM	MODE/LEVEL	TEST LOCATION	WAVEFORM	MODE/LEVEL
IC101 Pin 37		REC, EE 1 Vp-p	IC101 Pin 34		PB 2.5 Vp-p
IC101 Pin 3		REC, EE 0.6 Vp-p	IC101 Pin 34		REC, EE 2 Vp-p
IC101 Pin 4		REC, EE 0.5 Vp-p	IC101 (UPPER) Pin 34 (LOWER) Pin 33		STILL (UPPER) 2 Vp-p (LOWER) 5 Vp-p
IC101 Pin 5		REC, EE 1.2 Vp-p	IC101 Pin 15		REC, EE 0.7 Vp-p
IC101 Pin 40		REC, EE 1.0 Vp-p	Q1211 Base		PB 0.2 Vp-p
IC101 Pin 39		PB 0.3 Vp-p	Q1212 Emitter		PB 0.25 Vp-p
IC101 Pin 3		PB 0.5 Vp-p	IC101 Pin 15		PB 0.25 Vp-p
IC101 Pin 4		PB 0.5 Vp-p	IC101 Pin 25		PB 1.0 Vp-p
IC101 Pins 10/12		PB 0.3 Vp-p	IC101 Pin 31		PB 0.6 Vp-p

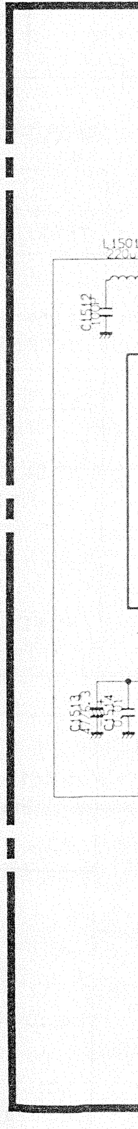
VP-1 BOARD VIDEO PRE-AMP CIRCUIT DIAGRAM


VP-1
V2-13509/BF4N-MESY
VIDEO PRE-AMP
IC191
LA7374
CN194
LP CH-1
LP COM.
LP CH-2
SP CH-2
SP COM.
SP CH-1
GND
TO MECHANISM
CN191
ENV DET
REC C
GND
REC Y
PB Y
GND
PB C/REC H
RF SW P
60HZ
SWD 5V
S PLY
H AMP SW
ENV SW
TO CP-1 (VD-A) CN101
TO CP-1 (SV-A) CN354
SWITCH
PHASE COMPENSATION
BUFFER
Q1951 2SC3399
Q1952 2SC2839
Q1953 2SC2839
Q1956 2SC536
D1901
TP181
TP182
TP183
VOLTAGE : REC(PLAY) MODE


VR161
VR162
SYNC. GATE
VR131
CN161
X1501

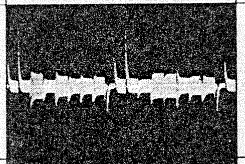
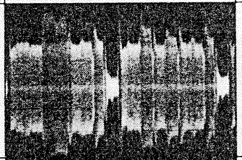
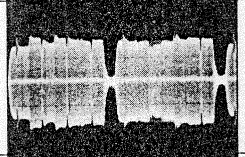
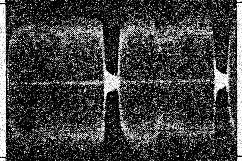
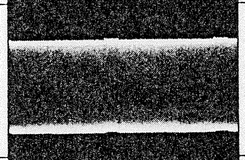
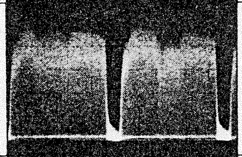
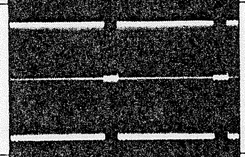
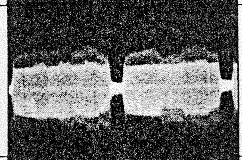
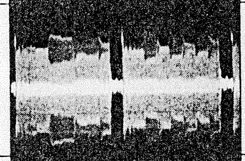
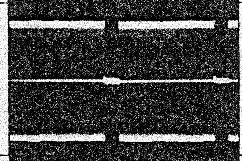
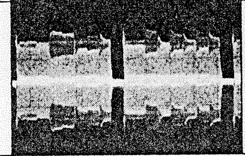
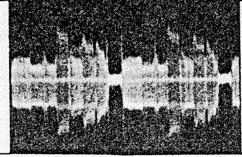
VP-1 P.C.B.

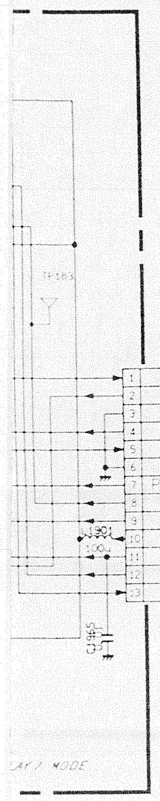

VP-1
JCI-N1S
1AC4B11A43300B
CN194
IC191
CN191
TP181
TP182
TP183
D1901



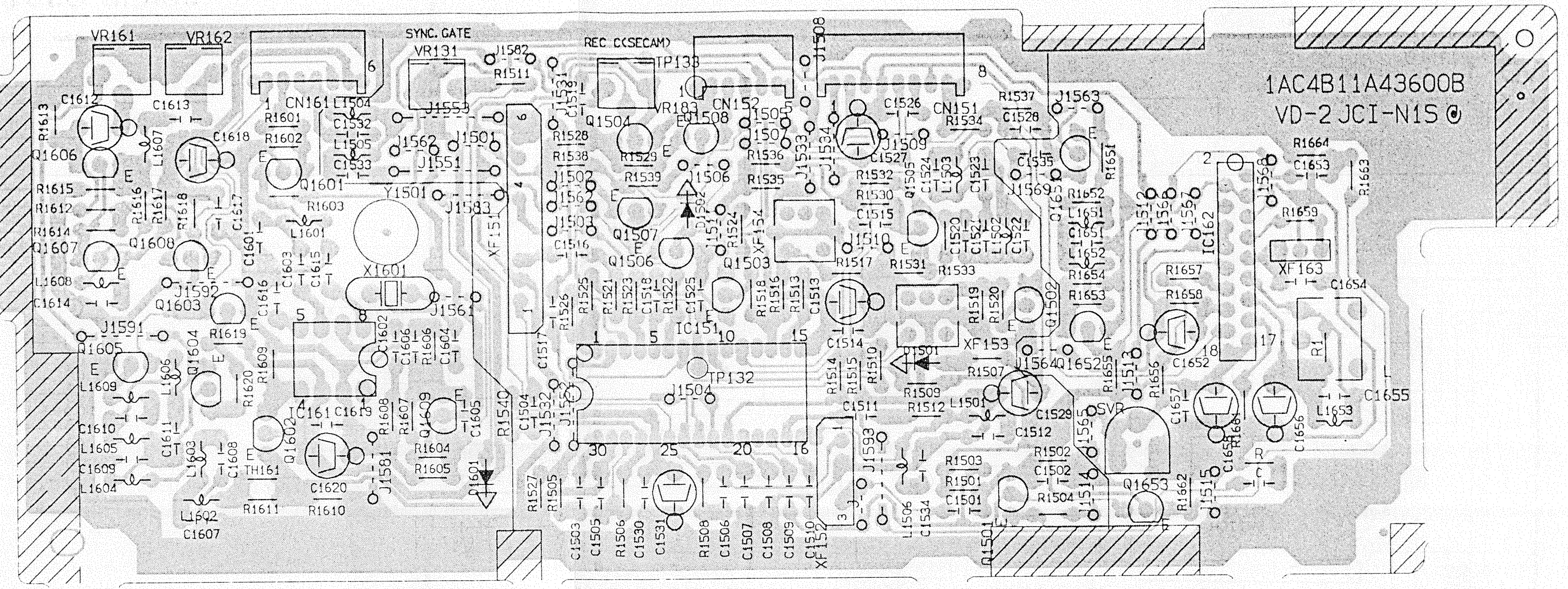
WAVEFORM OF VIDEO (SECAM MODE) VD-2 BOARD

WF-VBF-S

REC. (EE) MODE			PLAY MODE		
TEST LOCATION	WAVEFORM	MODE/LEVEL	TEST LOCATION	WAVEFORM	MODE/LEVEL
IC151 Pin 7		0.7 Vp-p	IC151 Pin 11		0.2 Vp-p
IC151 Pin 27		0.4 Vp-p	IC151 Pin 5		0.6 Vp-p
IC151 Pin 30		0.4 Vp-p	IC151 Pin 17		1 Vp-p
IC151 Pin 1		1 Vp-p	X151 B.P.F Pin 3		0.2 Vp-p
IC151 Pin 5		0.5 Vp-p	IC151 Pin 25		1 Vp-p
IC151 Pin 4		1 Vp-p	IC151 Pin 10		0.3 Vp-p

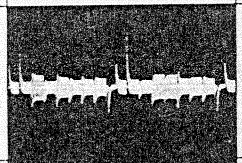
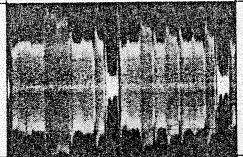
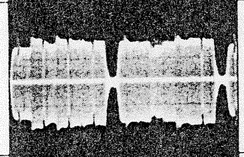
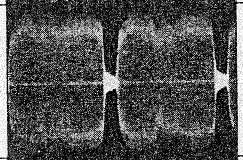
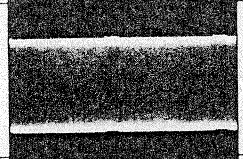
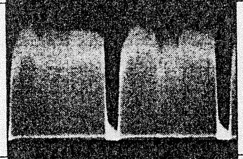
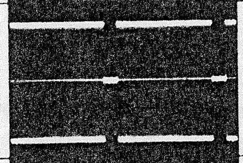
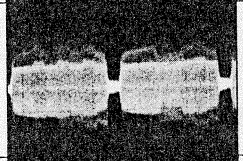
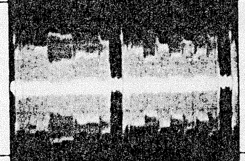
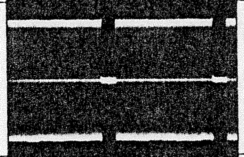
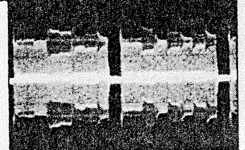
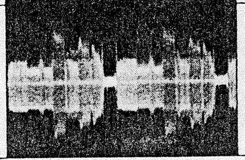

CN191
1 ENV DET
2 REC C
3 GND
4 REC Y
5 PB Y
6 GND
7 PB C/REC H
8 RF SW P
9 60HZ
10 SWD 5V
11 S PLY
12 H AMP SW
13 ENV SW
TO CP-1 (VD-A) CN101
TO CP-1 (SV-A) CN354
L1901 100u
C1965
TP163

VD-2 P.C.B.

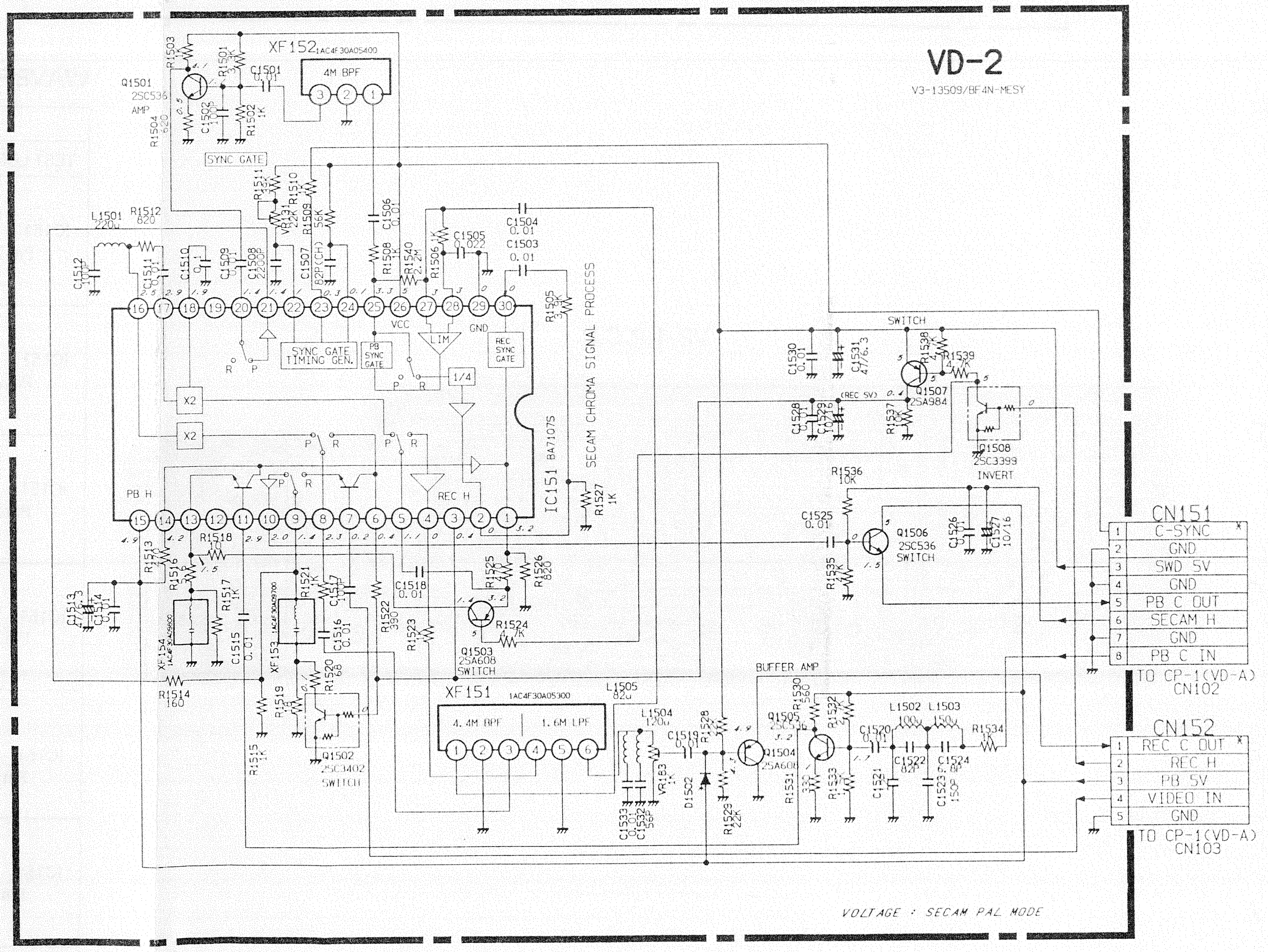

1AC4B11A43600B
VD-2 JCI-N1S
VR161
VR162
SYNC. GATE
VR131
REC C(SECAM)
TP133
CN161
CN152
CN151
IC151
IC162
X1601
XF151
XF153
XF163
TP132
Q1501
Q1502
Q1503
Q1504
Q1505
Q1506
Q1507
Q1508
Q1509
Q1601
Q1602
Q1603
Q1604
Q1605
Q1606
Q1607
Q1608
Q1652
Q1653
TH161
SVR

WAVEFORM OF VIDEO (SECAM MODE) VD-2 BOARD

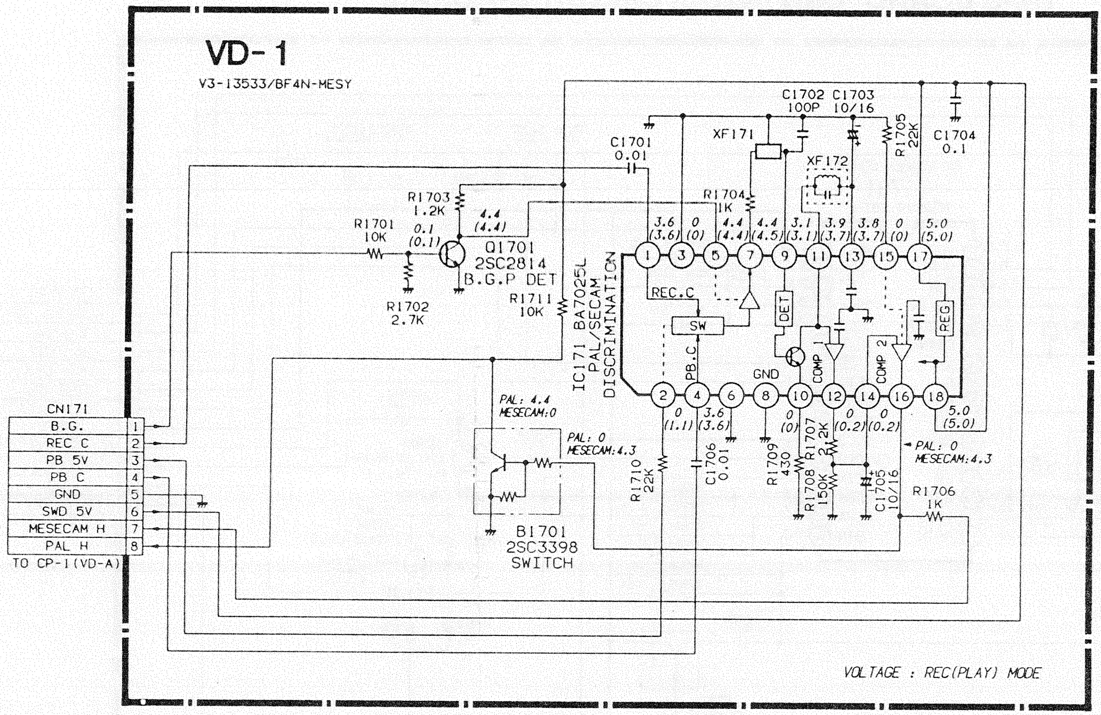
WF-VBF-S

REC. (EE) MODE			PLAY MODE		
TEST LOCATION	WAVEFORM	MODE/LEVEL	TEST LOCATION	WAVEFORM	MODE/LEVEL
IC151 Pin 7		0.7 Vp-p	IC151 Pin 11		0.2 Vp-p
IC151 Pin 27		0.4 Vp-p	IC151 Pin 5		0.6 Vp-p
IC151 Pin 30		0.4 Vp-p	IC151 Pin 17		1 Vp-p
IC151 Pin 1		1 Vp-p	X151 B.P.F Pin 3		0.2 Vp-p
IC151 Pin 5		0.5 Vp-p	IC151 Pin 25		1 Vp-p
IC151 Pin 4		1 Vp-p	IC151 Pin 10		0.3 Vp-p

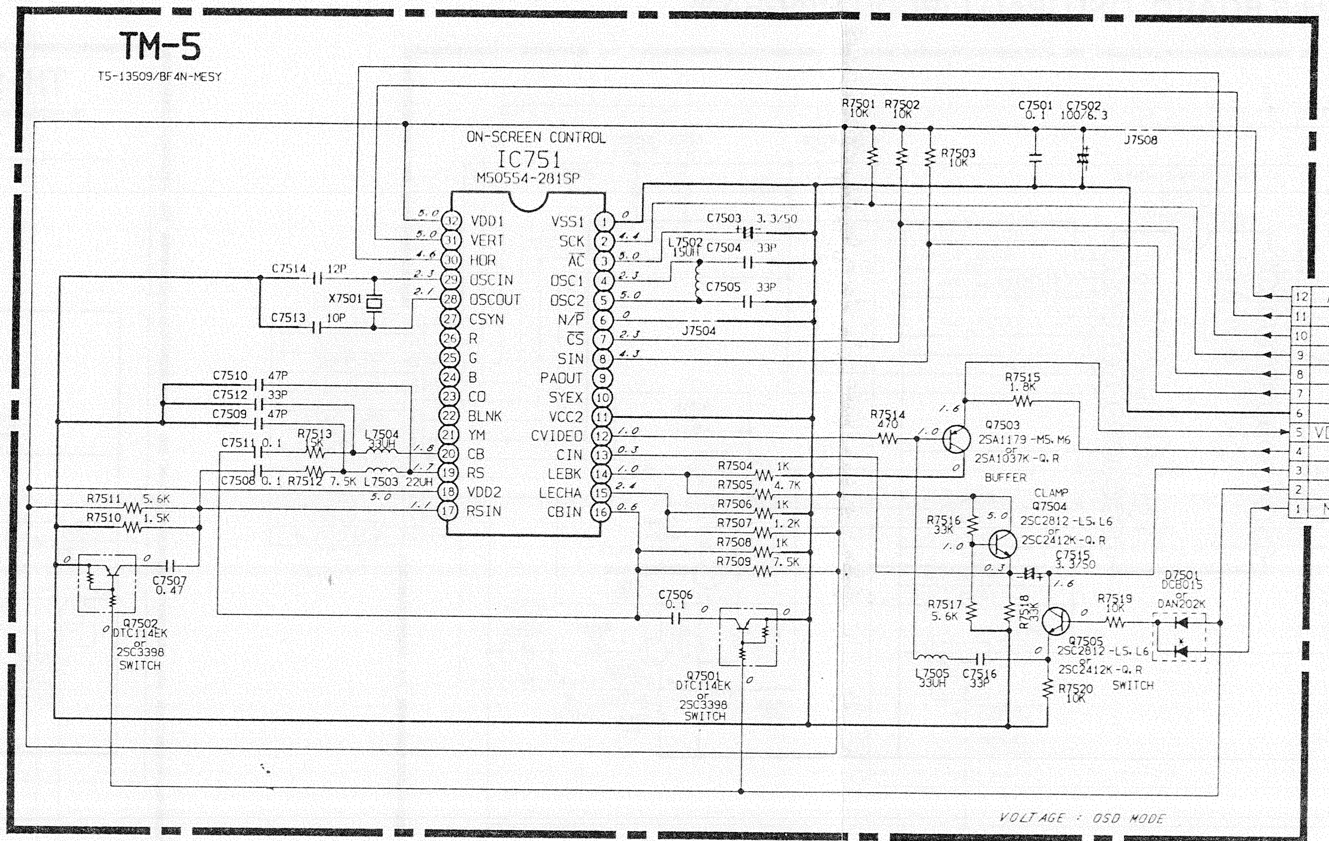
VD-2 BOARD SECAM CHROMA SIGNAL PROCESS CIRCUIT DIAGRAM


VD-2
V3-13509/BF4N-MESY
XF152 1AC4F30A05400
4M BPF
Q1501 2SC536 AMP
SYNC GATE
L1501 220u
R1512 820
SYNC GATE TIMING GEN.
PB SYNC GATE
VCC
LIM
GND
REC SYNC GATE
1/4
X2
X2
PB H
REC H
IC151 BA7107S
SECAM CHROMA SIGNAL PROCESS
SWITCH
Q1507 2SA984
Q1508 2SC3399 INVERT
Q1506 2SC536 SWITCH
Q1503 2SA608 SWITCH
Q1502 2SC3402 SWITCH
XF151 1AC4F30A05300
4.4M BPF
1.6M LPF
XF154
XF153
BUFFER AMP
Q1504 2SA608
Q1505 2SC536
L1502
L1503
L1504 120u
L1505 82u
D1522
CN151
1 C-SYNC
2 GND
3 SWD 5V
4 GND
5 PB C OUT
6 SECAM H
7 GND
8 PB C IN
TO CP-1(VD-A) CN102
CN152
1 REC C OUT
2 REC H
3 PB 5V
4 VIDEO IN
5 GND
TO CP-1(VD-A) CN103
VOLTAGE : SECAM PAL MODE

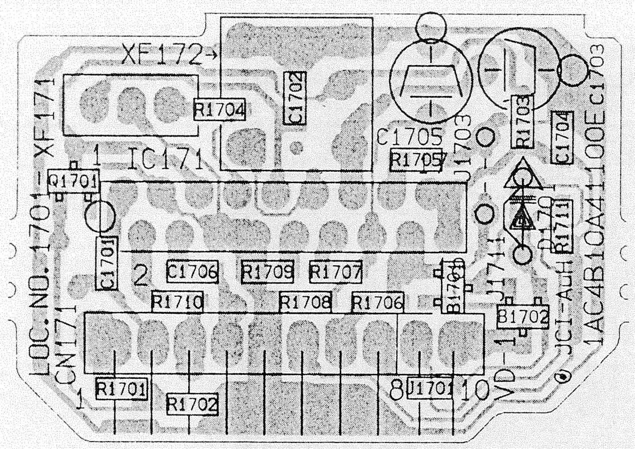
VD-1 BOARD PAL/SECAM DISCRIMINATION CIRCUIT DIAGRAM


VD-1
V3-13533/BF4N-MESY
IC171 BA7025L PAL/SECAM DISCRIMINATION
Q1701 2SC2814 B.G.P DET
B1701 2SC3398 SWITCH
R1701 10K
R1702 2.7K
R1703 1.2K
R1704 1K
R1705 22K
R1706 1K
R1707 12K
R1708 150K
R1709 430
R1710 22K
R1711 10K
C1701 0.01
C1702 100P
C1703 10/16
C1704 0.1
C1705 10/16
C1706 0.01
XF171
XF172
REC.C
SW
DET
COMP
COMP 2
REG
GND
PB.C
PAL: 4.4
MESECAM: 0
PAL: 0
MESECAM: 4.3
CN171
B.G.
REC C
PB 5V
PB C
GND
SWD 5V
MESECAM H
PAL H
TO CP-1 (VD-A)
VOLTAGE : REC(PLAY) MODE

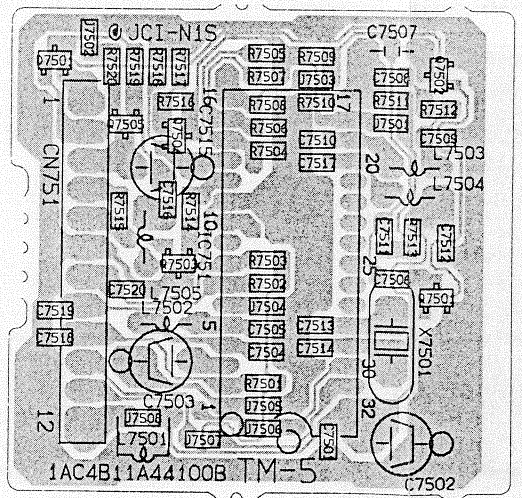
TM-5 BOARD OSD (PAL) CIRCUIT DIAGRAM


TM-5
T5-13509/BF4N-MESY
ON-SCREEN CONTROL
IC751
M50554-281SP
VDD1
VERT
HOR
OSCIN
OSCOUT
CSYN
R
G
B
CO
BLNK
YM
CB
RS
VDD2
RSIN
VSS1
SCK
AC
OSC1
OSC2
N/P
CS
SIN
PAOUT
SYEX
VCC2
CVIDEO
CIN
LEBK
LECHA
CBIN
X7501
C7501 0.1
C7502 100/6.3
C7503 3.3/50
C7504 33P
C7505 33P
C7506 0.1
C7507 0.47
C7508 0.1
C7509 47P
C7510 47P
C7511 0.1
C7512 33P
C7513 10P
C7514 12P
C7515 3.3/50
C7516 33P
L7502 150H
L7503 22UH
L7504 22UH
L7505 33UH
R7501 10K
R7502 10K
R7503 10K
R7504 1K
R7505 4.7K
R7506 1K
R7507 1.2K
R7508 1K
R7509 7.5K
R7510 1.5K
R7511 5.6K
R7512 7.5K
R7513 15K
R7514 470
R7515 1.8K
R7516 33K
R7517 5.6K
R7518 33K
R7519 10K
R7520 10K
J7504
J7508
Q7501 DTC114EK or 2SC3398 SWITCH
Q7502 DTC114EK or 2SC3398 SWITCH
Q7503 2SA1179-M5,M6 or 2SA1037K-Q,R BUFFER
Q7504 2SC2812-L5,L6 or 2SC2412K-Q,R CLAMP
Q7505 2SC2812-L5,L6 or 2SC2412K-Q,R SWITCH
D7501 DCB015 or DAN202K
CN751
ALWAYS 5V
V.SYNC
H.SYNC
OSD CLK
OSD CS
OSD DATA
GND
VD(OSD PAL)
SWD 12V
VD
B.C.OFF
MESECAM H
TO CP-1 (VD-A)
VOLTAGE : OSD MODE

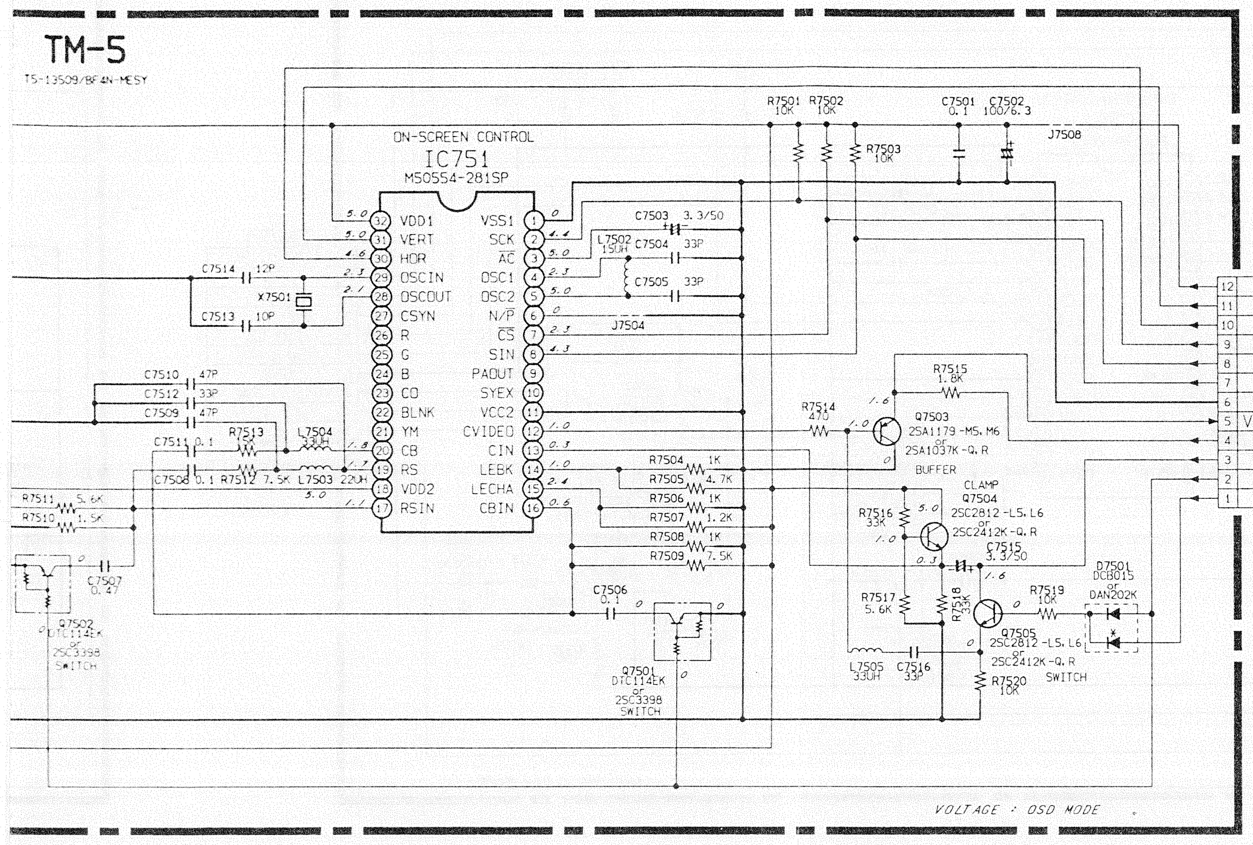
VD-1 P.C.B.


XF172
XF171
IC171
R1701
R1702
R1703
R1704
R1705
R1706
R1707
R1708
R1709
R1710
R1711
C1701
C1702
C1703
C1704
C1705
C1706
B1701
B1702
D1703
J1711
CN171
LOC. NO. 1701
VD-1
JCI-AUH
1AC4B10A41100E

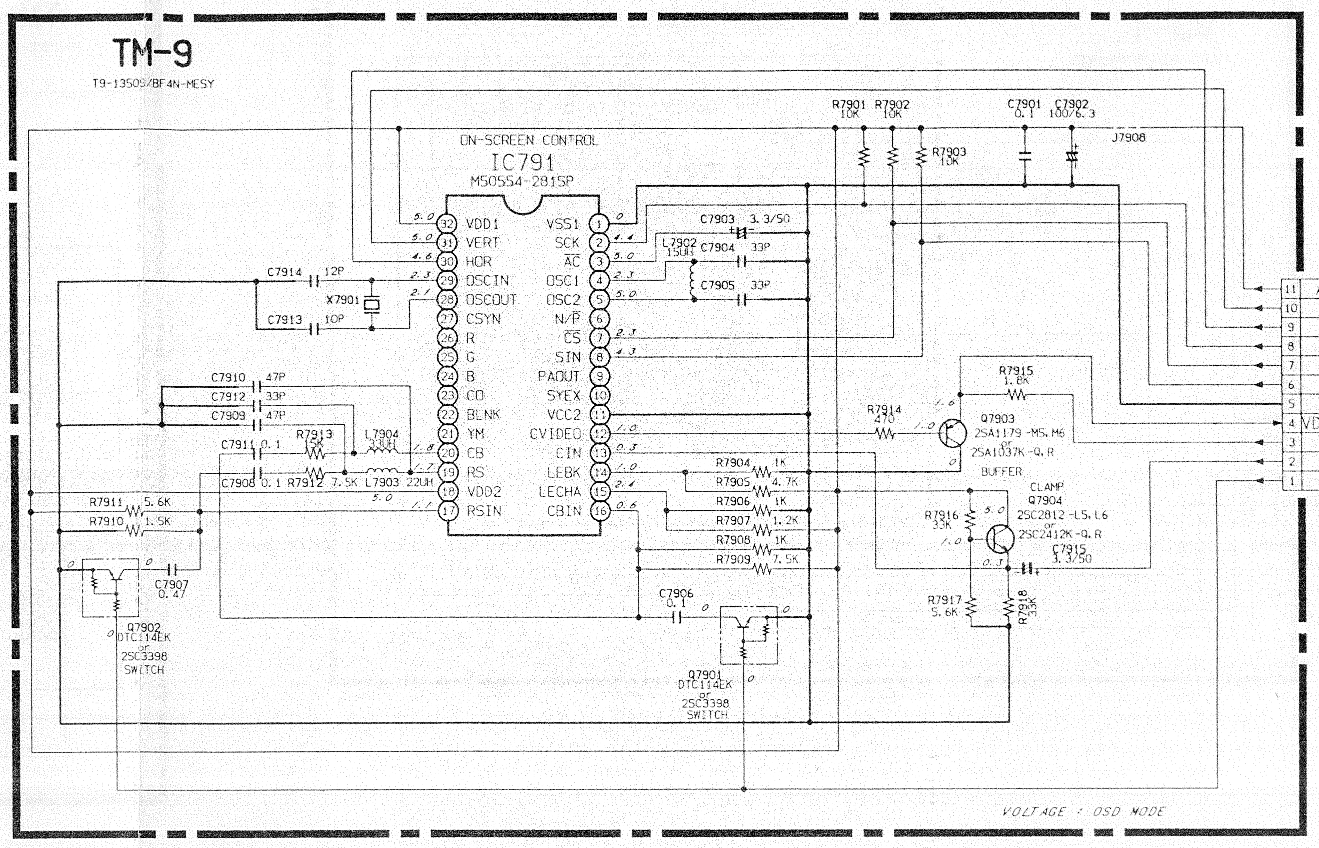
TM-5 P.C.B.


JCI-N1S
CN751
C7502
C7503
C7507
C7515
C7520
L7501
L7502
L7503
L7504
L7505
X7501
1AC4B11A44100B
TM-5

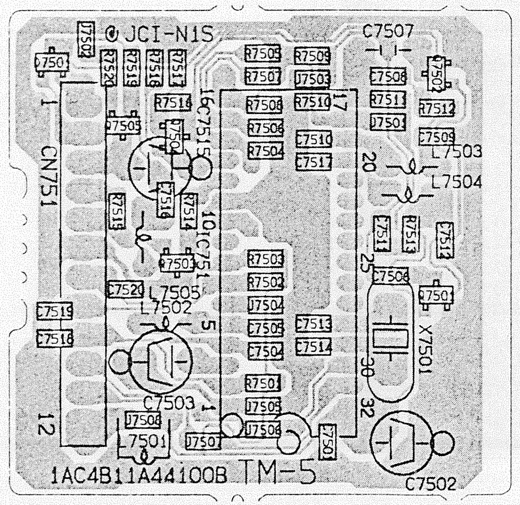
TM-5 BOARD OSD (PAL) CIRCUIT DIAGRAM


TM-5
T5-13509/BF4N-MESY
ON-SCREEN CONTROL
IC751
M50554-281SP
VDD1
VERT
HOR
OSCIN
OSCOUT
CSYN
R
G
B
CO
BLNK
YM
CB
RS
VDD2
RSIN
VSS1
SCK
AC
OSC1
OSC2
N/P
CS
SIN
PAOUT
SYEX
VCC2
CVIDEO
CIN
LEBK
LECHA
CBIN
X7501
J7508
CN751
12 ALWAYS 5V
11 V. SYNC
10 H. SYNC
9 OSD CLK
8 OSD CS
7 OSD DATA
6 GND
5 VD(OSD PAL)
4 SWD 12V
3 VD
2 B.C.OFF
1 MESECAM H
TO CP-1
(VD-A)
Q7503
2SA1179 -M5,M6
or
2SA1037K-Q,R
BUFFER
CLAMP
Q7504
2SC2812 -L5,L6
or
2SC2412K-Q,R
Q7505
2SC2812 -L5,L6
or
2SC2412K-Q,R
SWITCH
D7501
DCB015
or
DAN202K
Q7501
DTC114EK
or
2SC3398
SWITCH
Q7502
DTC114EK
or
2SC3398
SWITCH
VOLTAGE : OSD MODE

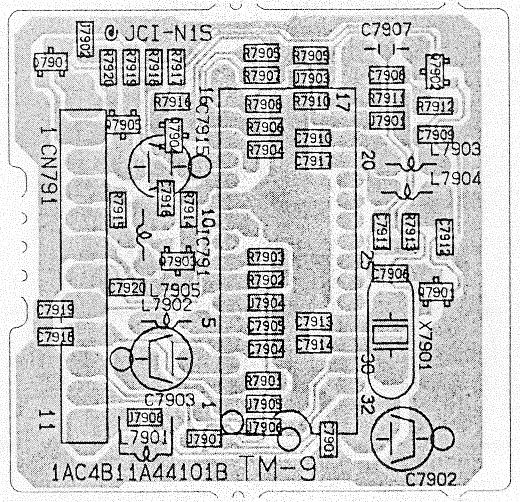
TM-9 BOARD OSD (NTSC) CIRCUIT DIAGRAM


TM-9
T9-13509/BF4N-MESY
ON-SCREEN CONTROL
IC791
M50554-281SP
VDD1
VERT
HOR
OSCIN
OSCOUT
CSYN
R
G
B
CO
BLNK
YM
CB
RS
VDD2
RSIN
VSS1
SCK
AC
OSC1
OSC2
N/P
CS
SIN
PAOUT
SYEX
VCC2
CVIDEO
CIN
LEBK
LECHA
CBIN
X7901
J7908
CN791
11 ALWAYS 5V
10 V. SYNC
9 H. SYNC
8 OSD CLK
7 OSD CS
6 OSD DATA
5 GND
4 VD(OSD NTSC)
3 SWD 12V
2 VD
1 B.C.OFF
TO CP-1
(VD-A)
Q7903
2SA1179 -M5,M6
or
2SA1037K-Q,R
BUFFER
CLAMP
Q7904
2SC2812 -L5,L6
or
2SC2412K-Q,R
Q7901
DTC114EK
or
2SC3398
SWITCH
Q7902
DTC114EK
or
2SC3398
SWITCH
VOLTAGE : OSD MODE

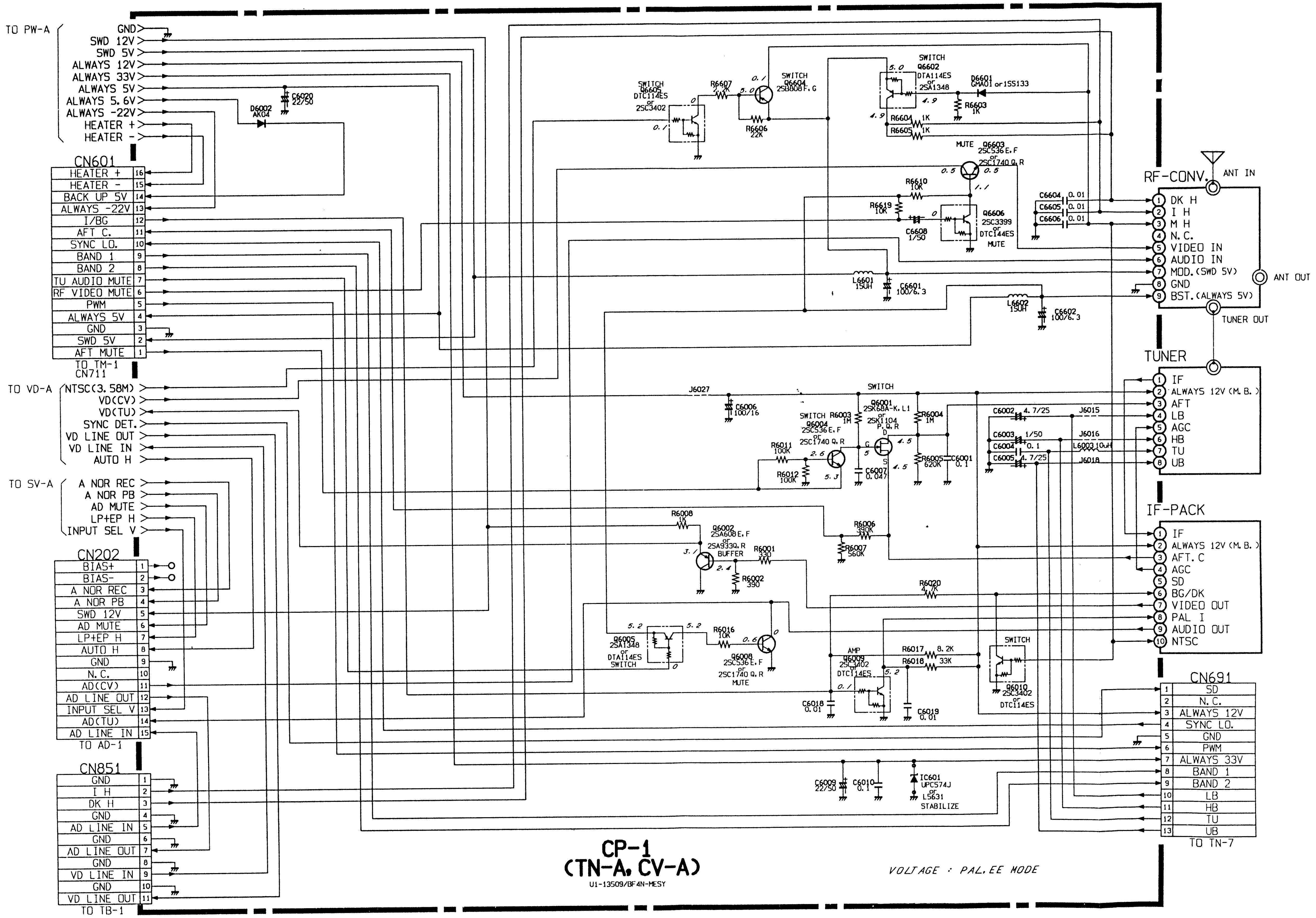
TM-5 P.C.B.

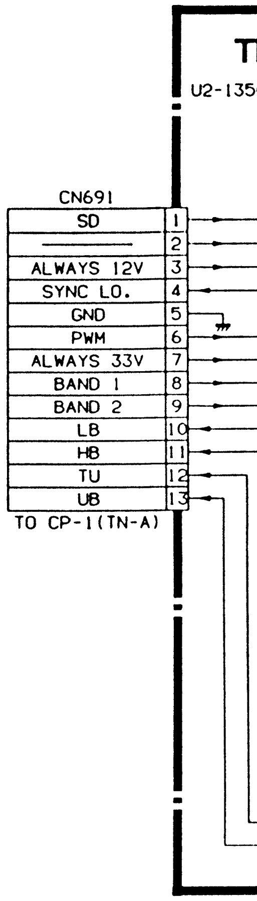

JCI-N1S
CN751
IC751
X7501
L7503
L7504
L7505
L7502
L7501
C7503
C7507
C7502
1AC4B11A44100B TM-5

TM-9 P.C.B.


JCI-N1S
CN791
IC791
X7901
L7903
L7904
L7905
L7902
L7901
C7903
C7907
C7902
1AC4B11A44101B TM-9

CP-1 BOARD (TN-A, CV-A) TUNER IF & RF CONVERTER CONNECTION CIRCUIT DIAGRAM

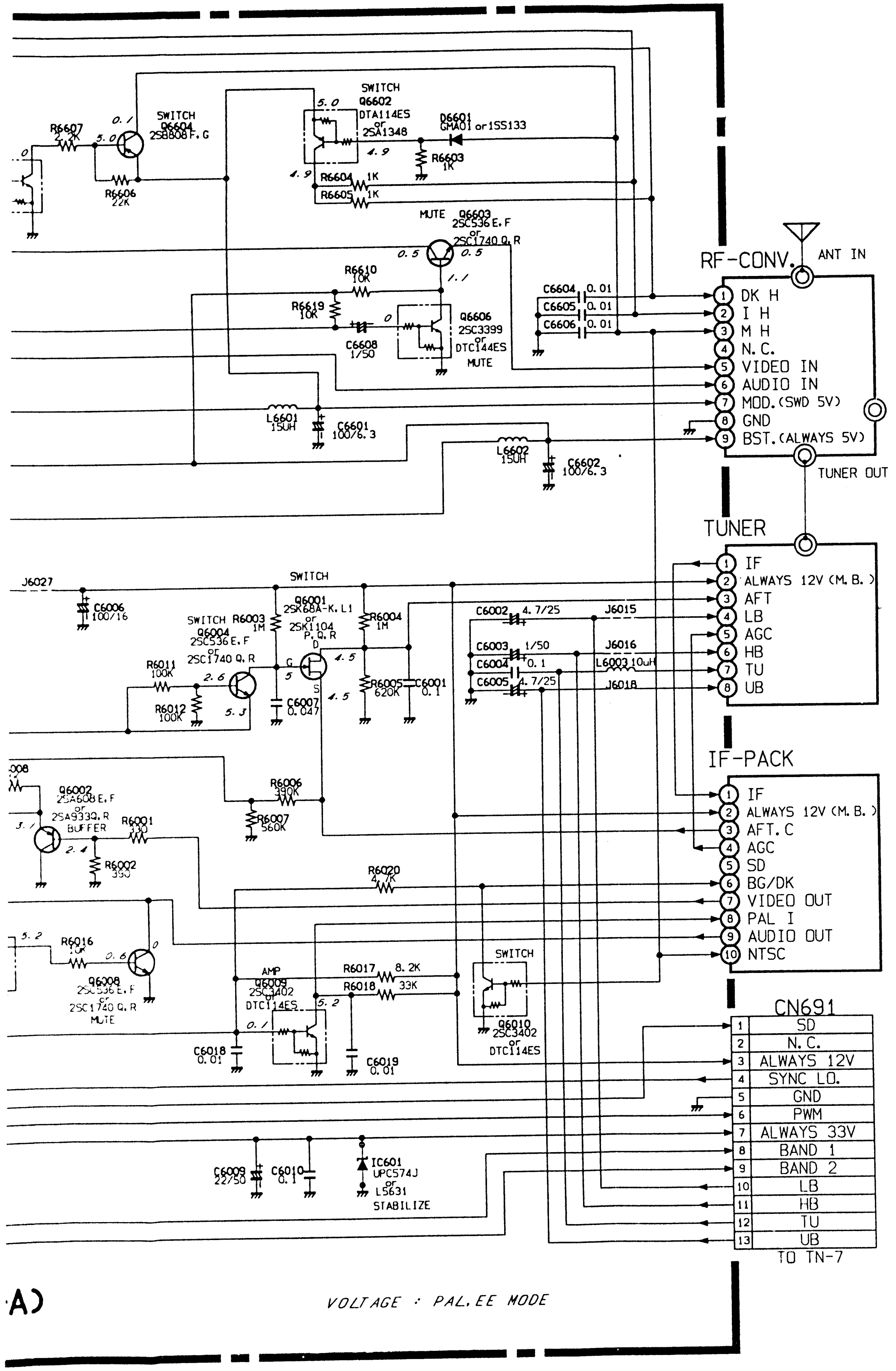

TO PW-A
GND
SWD 12V
SWD 5V
ALWAYS 12V
ALWAYS 33V
ALWAYS 5V
ALWAYS 5.6V
ALWAYS -22V
HEATER +
HEATER -
D6002 AK04
C6020 22/50
CN601
HEATER + 16
HEATER - 15
BACK UP 5V 14
ALWAYS -22V 13
I/BG 12
AFT C. 11
SYNC LO. 10
BAND 1 9
BAND 2 8
TU AUDIO MUTE 7
RF VIDEO MUTE 6
PWM 5
ALWAYS 5V 4
GND 3
SWD 5V 2
AFT MUTE 1
TO TM-1 CN711
TO VD-A
NTSC(3.58M)
VD(CV)
VD(TU)
SYNC DET.
VD LINE OUT
VD LINE IN
AUTO H
TO SV-A
A NOR REC
A NOR PB
AD MUTE
LP+EP H
INPUT SEL V
CN202
BIAS+ 1
BIAS- 2
A NOR REC 3
A NOR PB 4
SWD 12V 5
AD MUTE 6
LP+EP H 7
AUTO H 8
GND 9
N.C. 10
AD(CV) 11
AD LINE OUT 12
INPUT SEL V 13
AD(TU) 14
AD LINE IN 15
TO AD-1
CN851
GND 1
I H 2
DK H 3
GND 4
AD LINE IN 5
GND 6
AD LINE OUT 7
GND 8
VD LINE IN 9
GND 10
VD LINE OUT 11
TO TB-1
SWITCH Q6605 DTC114ES or 2SC3402
R6607 2.2K
SWITCH Q6604 2SB808F.G
R6606 22K
SWITCH Q6602 DTA114ES or 2SA1348
D6601 GMA01 or 1SS133
R6603 1K
R6604 1K
R6605 1K
MUTE Q6603 2SC536E.F or 2SC1740 Q.R
R6610 10K
R6619 10K
C6608 1/50
Q6606 2SC3399 or DTC144ES MUTE
C6604 0.01
C6605 0.01
C6606 0.01
L6601 15UH
C6601 100/6.3
L6602 15UH
C6602 100/6.3
RF-CONV.
ANT IN
DK H
I H
M H
N.C.
VIDEO IN
AUDIO IN
MOD.(SWD 5V)
GND
BST.(ALWAYS 5V)
ANT OUT
TUNER OUT
TUNER
IF
ALWAYS 12V (M.B.)
AFT
LB
AGC
HB
TU
UB
J6027
C6006 100/16
SWITCH
Q6001 2SK68A-K.L1 or 2SK1104 P.Q.R
SWITCH Q6004 2SC536E.F or 2SC1740 Q.R
R6003 1M
R6004 1M
R6011 100K
R6012 100K
C6007 0.047
R6005 620K
C6001 0.1
C6002 4.7/25
C6003 1/50
C6004 0.1
C6005 4.7/25
L6003 10uH
J6015
J6016
J6018
IF-PACK
IF
ALWAYS 12V (M.B.)
AFT.C
AGC
SD
BG/DK
VIDEO OUT
PAL I
AUDIO OUT
NTSC
R6008 1K
Q6002 2SA608E.F or 2SA933Q.R BUFFER
R6001 330
R6002 390
R6006 390K
R6007 560K
R6020 4.7K
Q6005 2SA1348 or DTA114ES SWITCH
R6016 10K
Q6008 2SC536E.F or 2SC1740 Q.R MUTE
AMP Q6009 2SC3402 or DTC114ES
R6017 8.2K
R6018 33K
C6018 0.01
C6019 0.01
SWITCH Q6010 2SC3402 or DTC114ES
C6009 22/50
C6010 0.1
IC601 UPC574J or L5631 STABILIZE
CN691
SD 1
N.C. 2
ALWAYS 12V 3
SYNC LO. 4
GND 5
PWM 6
ALWAYS 33V 7
BAND 1 8
BAND 2 9
LB 10
HB 11
TU 12
UB 13
TO TN-7
CP-1 (TN-A, CV-A)
U1-13509/BF4N-MESY
VOLTAGE : PAL.EE MODE


T
U2-135
CN691
SD 1
2
ALWAYS 12V 3
SYNC LO. 4
GND 5
PWM 6
ALWAYS 33V 7
BAND 1 8
BAND 2 9
LB 10
HB 11
TU 12
UB 13
TO CP-1(TN-A)

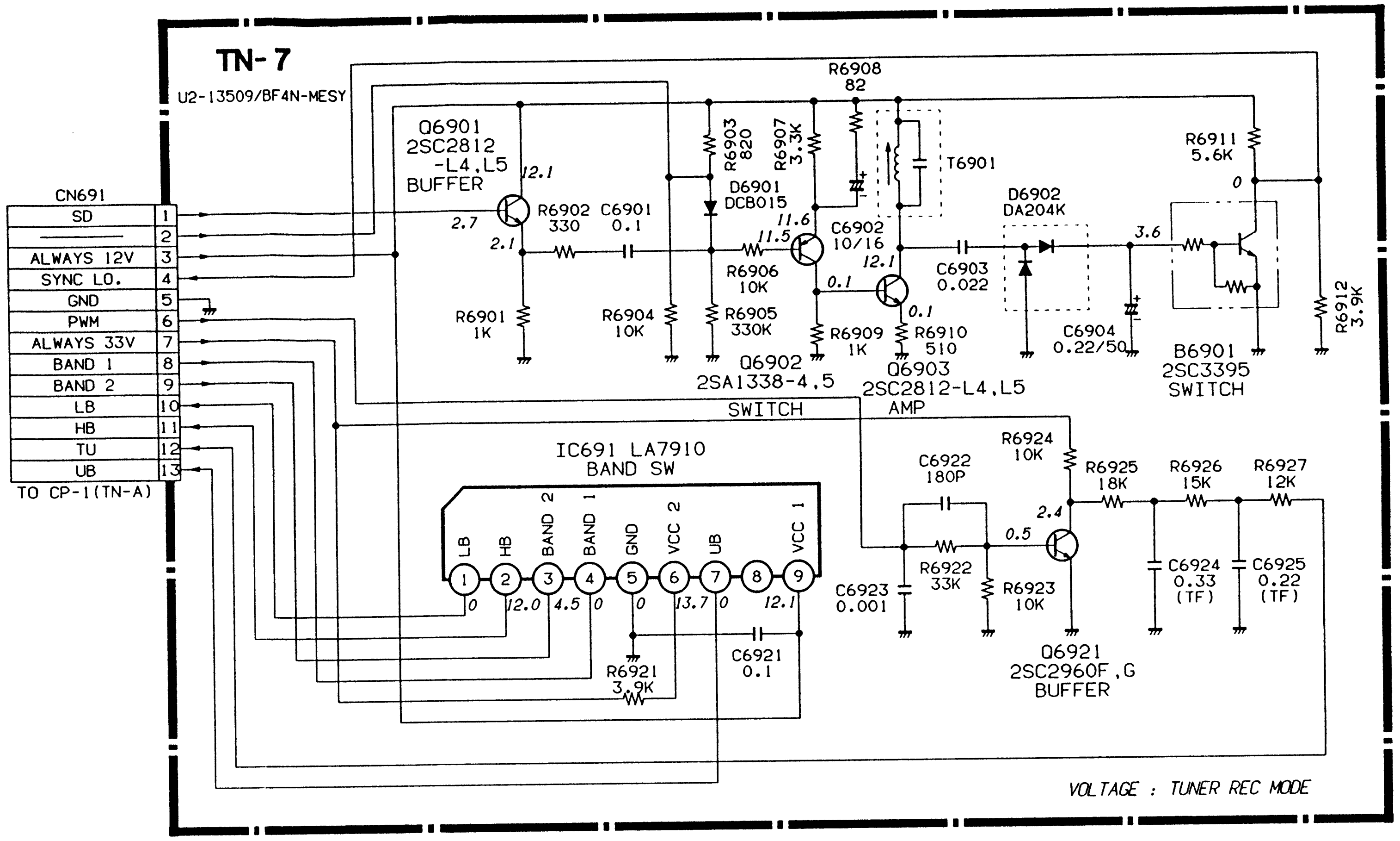
K
J
I
H
G
F
E
D
C
B
A

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

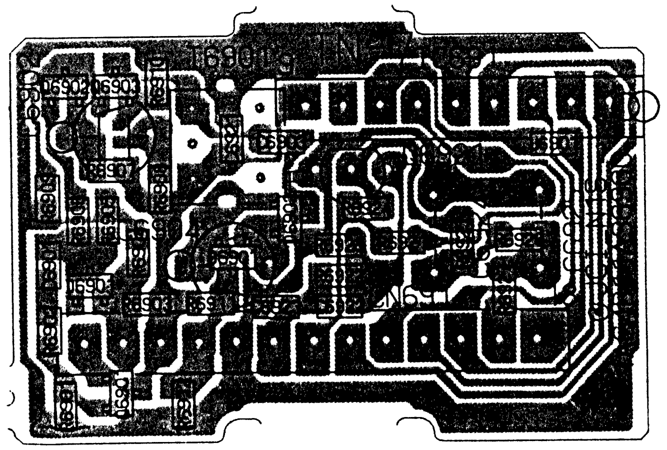
RTER CONNECTION CIRCUIT DIAGRAM


SWITCH Q6604 2SB808F.G
R6607 2.2K
R6606 22K
SWITCH Q6602 DTA114ES or 2SA1348
D6601 GMA01 or 1SS133
R6603 1K
R6604 1K
R6605 1K
MUTE Q6603 2SC536E.F or 2SC1740 Q.R
R6610 10K
R6619 10K
C6608 1/50
Q6606 2SC3399 or DTC144ES MUTE
C6604 0.01
C6605 0.01
C6606 0.01
L6601 15UH
C6601 100/6.3
L6602 15UH
C6602 100/6.3
RF-CONV.
ANT IN
① DK H
② I H
③ M H
④ N.C.
⑤ VIDEO IN
⑥ AUDIO IN
⑦ MOD.(SWD 5V)
⑧ GND
⑨ BST.(ALWAYS 5V)
ANT OUT
TUNER OUT
TUNER
① IF
② ALWAYS 12V (M.B.)
③ AFT
④ LB
⑤ AGC
⑥ HB
⑦ TU
⑧ UB
J6027
C6006 100/16
SWITCH R6003 1M
Q6004 2SC536E.F or 2SC1740 Q.R
Q6001 2SK68A-K.L1 or 2SK1104 P.Q.R
R6004 1M
R6005 620K
C6001 0.1
C6007 0.047
R6011 100K
R6012 100K
C6002 4.7/25
C6003 1/50
C6004 0.1
C6005 4.7/25
J6015
J6016
L6001 10uH
J6018
IF-PACK
① IF
② ALWAYS 12V (M.B.)
③ AFT.C
④ AGC
⑤ SD
⑥ BG/DK
⑦ VIDEO OUT
⑧ PAL I
⑨ AUDIO OUT
⑩ NTSC
Q6002 2SA608E.F or 2SA933Q.R BUFFER
R6001 330
R6002 390
R6006 390K
R6007 560K
R6020 4.7K
R6016 10K
Q6008 2SC536E.F or 2SC1740 Q.R MUTE
AMP Q6009 2SC3402 or DTC114ES
R6017 8.2K
R6018 33K
SWITCH Q6010 2SC3402 or DTC114ES
C6018 0.01
C6019 0.01
CN691
1 SD
2 N.C.
3 ALWAYS 12V
4 SYNC LO.
5 GND
6 PWM
7 ALWAYS 33V
8 BAND 1
9 BAND 2
10 LB
11 HB
12 TU
13 UB
TO TN-7
C6009 22/50
C6010 0.1
IC601 UPC574J or L5631 STABILIZE
A)
VOLTAGE : PAL.EE MODE

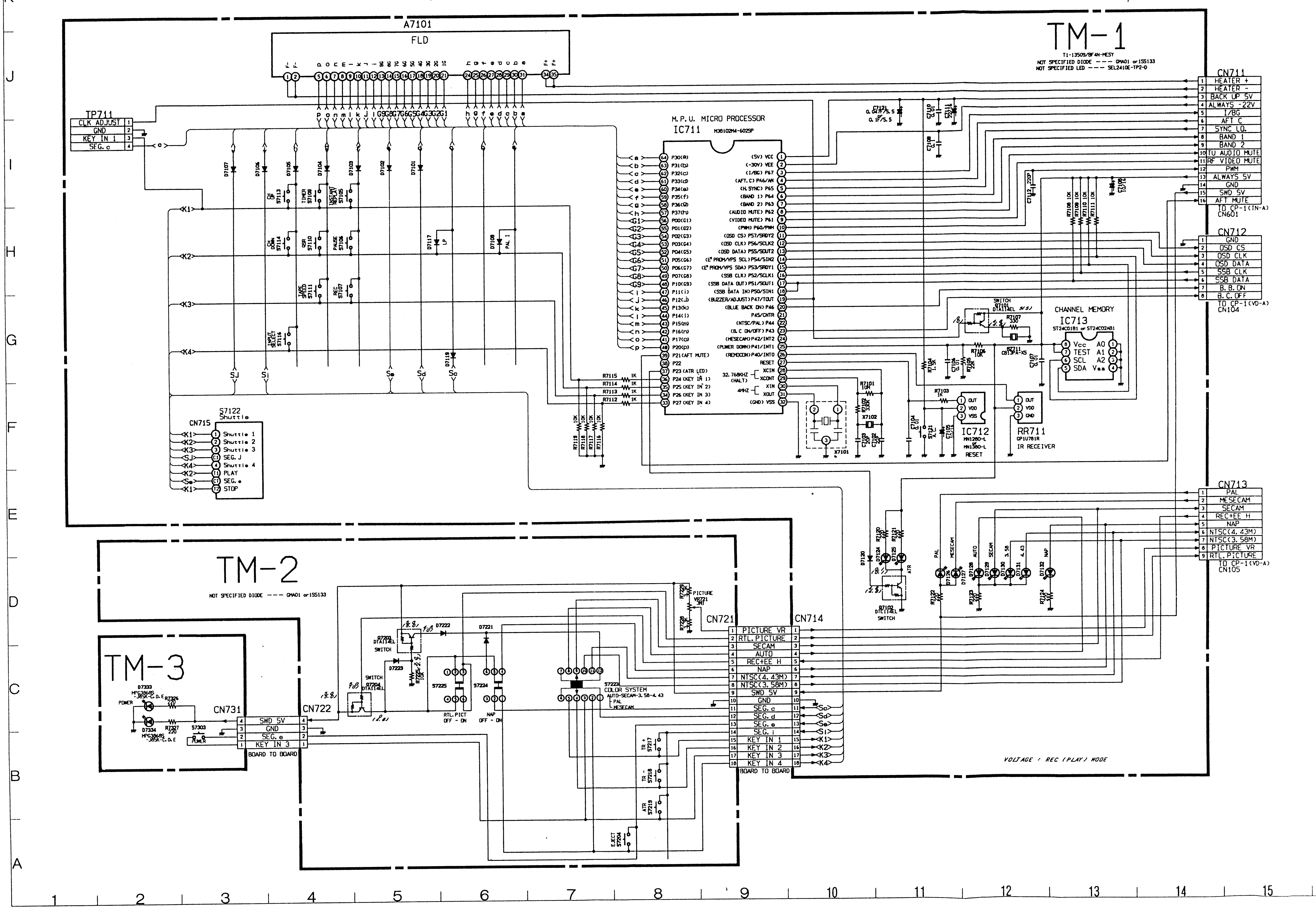
TN-7 BOARD SYNC DET. & TUNING CONTROL CIRCUIT DIAGRAM


TN-7
U2-13509/BF4N-MESY
CN691
1 SD
2 ———
3 ALWAYS 12V
4 SYNC LO.
5 GND
6 PWM
7 ALWAYS 33V
8 BAND 1
9 BAND 2
10 LB
11 HB
12 TU
13 UB
TO CP-1(TN-A)
Q6901 2SC2812 -L4.L5 BUFFER
R6902 330
C6901 0.1
R6901 1K
R6903 820
R6907 3.3K
D6901 DCB015
R6904 10K
R6906 10K
R6905 330K
Q6902 2SA1338-4.5 SWITCH
R6908 82
T6901
C6902 10/16
R6909 1K
R6910 510
Q6903 2SC2812-L4.L5 AMP
C6903 0.022
D6902 DA204K
C6904 0.22/50
R6911 5.6K
R6912 3.9K
B6901 2SC3395 SWITCH
IC691 LA7910 BAND SW
LB HB BAND 2 BAND 1 GND VCC 2 UB VCC 1
R6921 3.9K
C6921 0.1
C6922 180P
R6924 10K
R6925 18K
R6926 15K
R6927 12K
R6922 33K
R6923 10K
C6923 0.001
C6924 0.33 (TF)
C6925 0.22 (TF)
Q6921 2SC2960F.G BUFFER
VOLTAGE : TUNER REC MODE

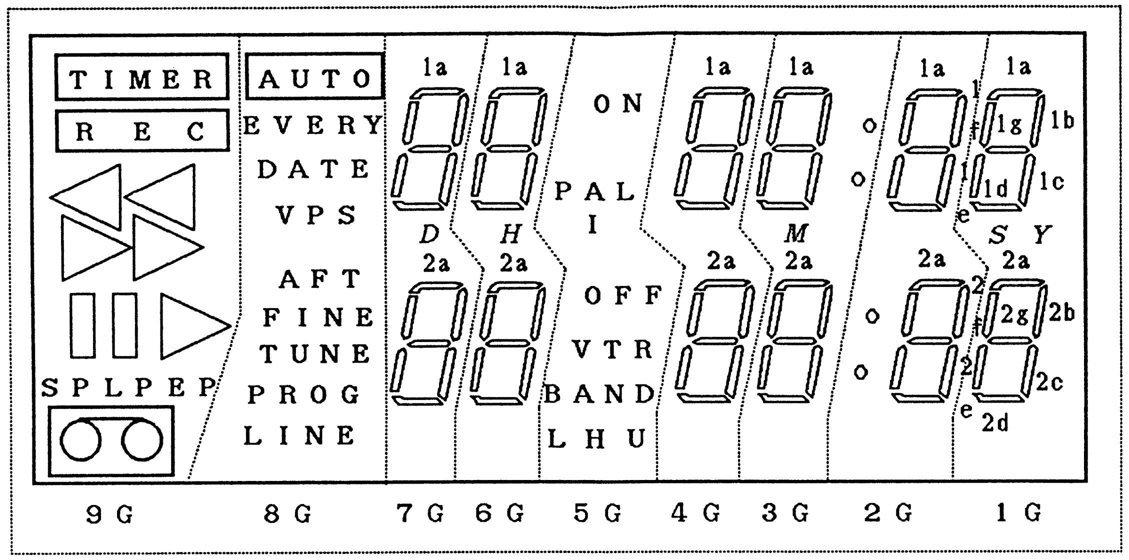
TN-7 P.C.B.



TM-1, 2, 3 BOARD TIMER/TUNING CONTROL, DISPLAY & OPERATION CIRCUIT DIAGRAM


TM-1
T1-13509/BF4N-MESY
NOT SPECIFIED DIODE --- GMA01 or 1SS133
NOT SPECIFIED LED --- SEL2410E-TP2-0
A7101
FLD
TP711
CLK ADJUST
GND
KEY IN 1
SEG. c
M.P.U. MICRO PROCESSOR
IC711 M38102M4-602SP
(5V) VCC
(-30V) VEE
(I/BG) P67
(AFT. C) P66/AN
(H. SYNC) P65
(BAND 1) P64
(BAND 2) P63
(AUDIO MUTE) P62
(VIDEO MUTE) P61
(PWM) P60/PWM
(OSD CS) P57/SRDY2
(OSD CLK) P56/SCLK2
(OSD DATA) P55/SOUT2
(E² PROM/VPS SCL) P54/SIN2
(E² PROM/VPS SDA) P53/SRDY1
(SSB CLK) P52/SCLK1
(SSB DATA OUT) P51/SOUT1
(SSB DATA IN) P50/SIN1
(BUZZER/ADJUST) P47/TOUT
(BLUE BACK ON) P46
P45/CNTR
(NTSC/PAL) P44
(B.C ON/OFF) P43
(MESECAM) P42/INT2
(POWER DOWN) P41/INT1
(REMOCON) P40/INT0
RESET
XCIN
XCOUT
XIN
XOUT
(GND) VSS
P30(a) P31(b) P32(c) P33(d) P34(e) P35(f) P36(g) P37(h)
P00(G1) P01(G2) P02(G3) P03(G4) P04(G5) P05(G6) P06(G7) P07(G8)
P10(G9) P11(i) P12(j) P13(k) P14(l) P15(m) P16(n) P17(o) P20(p)
P21(AFT MUTE) P22 P23 (ATR LED) P24 (KEY IN 1) P25 (KEY IN 2) P26 (KEY IN 3) P27 (KEY IN 4)
32.768KHZ (HALT)
4MHZ
CH UP S7113
TIMER S7109
INSTANT REPLAY S7105
CH DOWN S7114
OSR S7110
PAUSE S7106
TAPE SPEED S7111
REC S7107
INPUT SELECT S7116
D7101 D7102 D7103 D7104 D7105 D7106 D7107
D7117 LP
D7108 PAL I
D7119
R7115 R7114 R7113 R7112 1K
R7116 R7117 R7118 R7119 10K
CN715
S7122 Shuttle
Shuttle 1
Shuttle 2
Shuttle 3
SEG. J
Shuttle 4
PLAY
SEG. e
STOP
CN711
HEATER +
HEATER -
BACK UP 5V
ALWAYS -22V
I/BG
AFT C
SYNC LO.
BAND 1
BAND 2
TU AUDIO MUTE
RF VIDEO MUTE
PWM
ALWAYS 5V
GND
SWD 5V
AFT MUTE
TO CP-1 (TN-A) CN601
CN712
GND
OSD CS
OSD CLK
OSD DATA
SSB CLK
SSB DATA
B. B. ON
B. C. OFF
TO CP-1 (VD-A) CN104
CHANNEL MEMORY
IC713
ST24C01B1 or ST24C02AB1
Vcc TEST SCL SDA
A0 A1 A2 Vss
SWITCH Q7101 DTA114EL
R7107 330
X7101
X7102
R7101 10K
R7103
R7106 10K
RZ711 CB13PA-XS
IC712
MN1280-L
MN1380-L
RESET
OUT VDD VSS
RR711
GP1U781R
IR RECEIVER
OUT VDD GND
C7101 C7102 C7103 C7104 C7105 C7106 C7107 C7108 C7109 C7110 C7111 C7112 C7121
R7108 R7109 R7110 R7111 10K
CN713
PAL
MESECAM
SECAM
REC+EE H
NAP
NTSC(4.43M)
NTSC(3.58M)
PICTURE VR
RTL. PICTURE
TO CP-1 (VD-A) CN105
D7120 D7124 D7125 ATR
Q7102 DTC114EL SWITCH
R7120 R7121 R7122 R7123 R7124
PAL MESECAM AUTO SECAM 3.58 4.43 NAP
D7126 D7127 D7128 D7129 D7130 D7131 D7132
TM-2
NOT SPECIFIED DIODE --- GMA01 or 1SS133
PICTURE VR721 3M3
R7228 R7229
CN721
CN714
PICTURE VR
RTL. PICTURE
SECAM
AUTO
REC+EE H
NAP
NTSC(4.43M)
NTSC(3.58M)
SWD 5V
GND
SEG. c
SEG. d
SEG. e
SEG. i
KEY IN 1
KEY IN 2
KEY IN 3
KEY IN 4
BOARD TO BOARD
Q7203 DTA114EL SWITCH
Q7204 DTA114EL SWITCH
D7221 D7222 D7223
R7225 10K
S7225 RTL.PICT OFF - ON
S7224 NAP OFF - ON
S7223 COLOR SYSTEM
AUTO-SECAM-3.58-4.43
PAL
MESECAM
TR + S7217
TR - S7218
ATR S7219
EJECT S7204
CN722
TM-3
D7333 MPG3868S-J85K-C.D.E
D7334 MPG3868S-J85K-C.D.E
POWER
R7326
R7327 220
S7303 POWER
CN731
SWD 5V
GND
SEG. e
KEY IN 3
BOARD TO BOARD
VOLTAGE : REC (PLAY) MODE
K J I H G F E D C B A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

A7101 DISPLAY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE

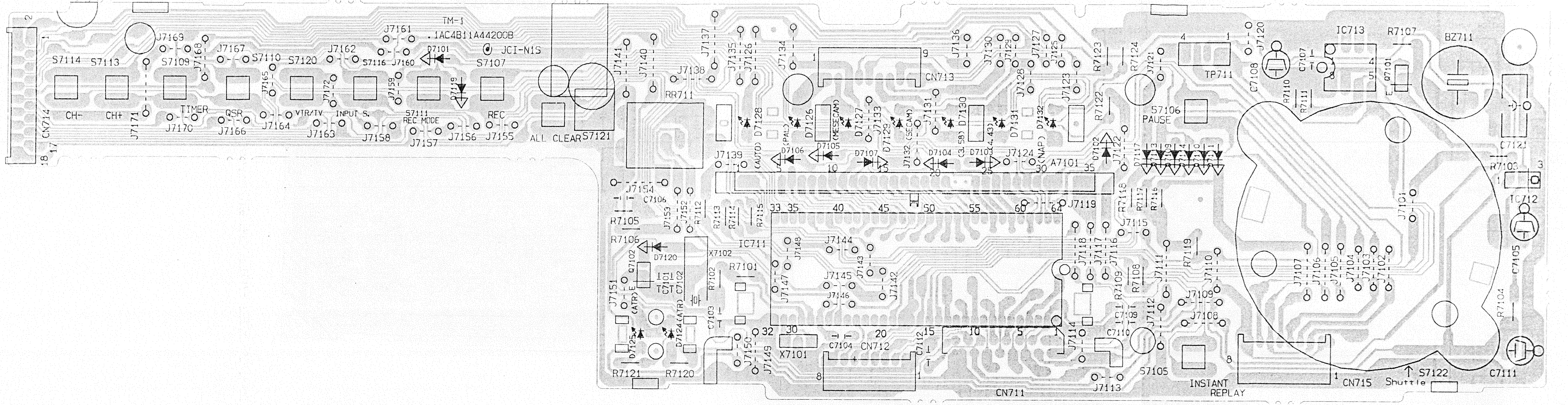

TIMER
REC
SP LP EP
AUTO
EVERY
DATE
VPS
AFT
FINE
TUNE
PROG
LINE
1a
1b
1c
1d
1g
1e
1f
2a
2b
2c
2d
2g
2e
2f
D
H
ON
PAL
I
OFF
VTR
BAND
L H U
M
S Y
9G
8G
7G
6G
5G
4G
3G
2G
1G

	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	TIMER	AUTO	a1	a1	▨ ON	a1	a1	a1	a1
b	REC	▨ EVERY	b1	b1	▨ PAL I	b1	b1	b1	b1
c	◀◀	▨ DATE	c1	c1		c1	c1	c1	c1
d	▶▶	▨ VPS	d1	d1		d1	d1	d1	d1
e			e1	e1		e1	e1	e1	e1
f			f1	f1		f1	f1	f1	f1
g			g1	g1		g1	g1	g1	g1
h			▨ D	H			▨ :	·(:T)	S
i	▌ ❚❚(L)	▨ AFT	a2	a2	▨ OFF	a2	a2	a2	a2
j	▌ ❚❚(R)	▨ FINE TUNE	b2	b2	VTR	b2	b2	b2	b2
k	▷		c2	c2	▨ BAND	c2	c2	c2	c2
l	SP	PROG	d2	d2	▨ L	d2	d2	d2	d2
m	LP	LINE	e2	e2	▨ H	e2	e2	e2	e2
n	EP		f2	f2	▨ U	f2	f2	f2	f2
o	🖭		g2	g2		g2	g2	g2	g2
p							M	.(:B)	▨ Y

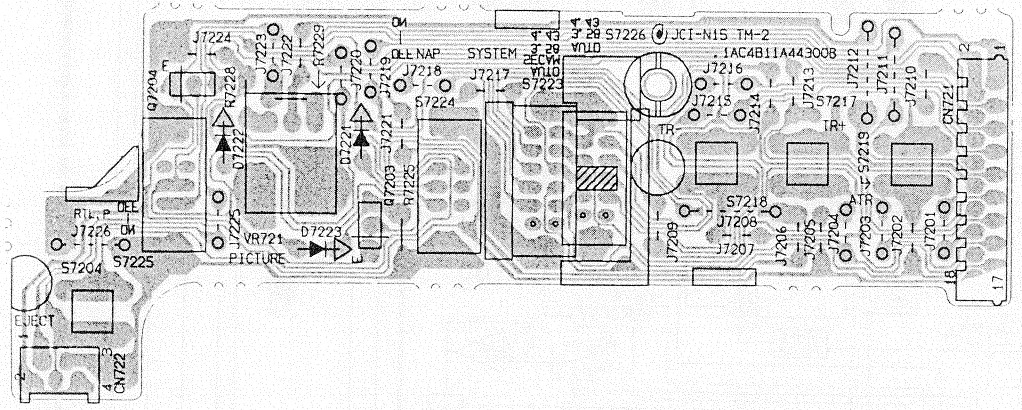
▨ : NOT USED

K
J
I
H
G
F
E
D
C
B
A

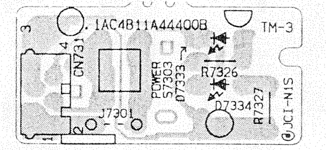
TM-1 P.C.B.

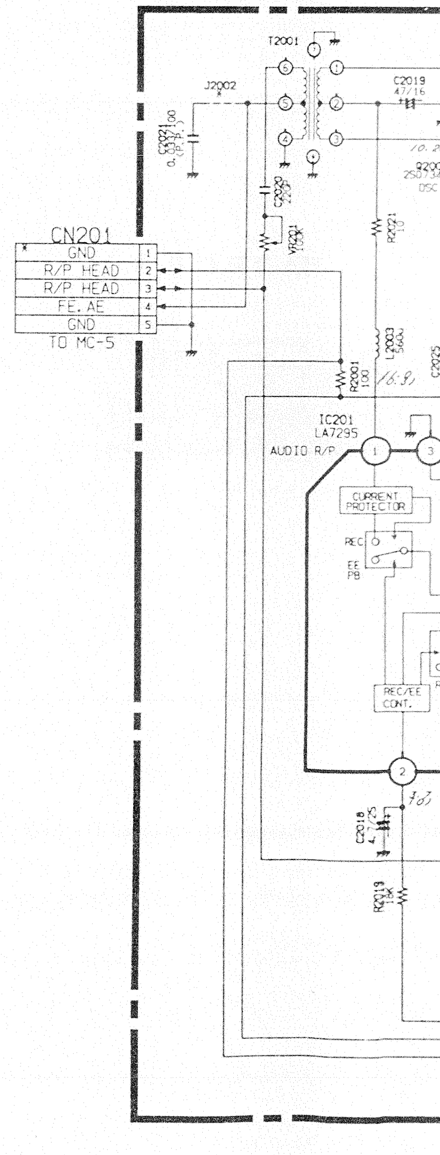

TM-1
1AC4B11A44200B
JCI-N1S
S7114
S7113
S7109
S7110
S7120
S7116
S7107
CH-
CH+
TIMER
QSR
VTR/TV
INPUT S.
S7111 REC MODE
REC
ALL CLEAR
S7121
CN714
RR711
IC711
X7101
X7102
CN711
CN712
CN713
CN715
TP711
IC713
IC712
BZ711
A7101
S7106 PAUSE
S7105
INSTANT REPLAY
Shuttle
S7122
(AUTO)
(PAL)
(MESECAM)
(SECAM)
(3.58)
(4.43)
(NAP)
(ATR)
C7111
C7105
R7104
R7103
R7107

TM-2 P.C.B.


JCI-N1S TM-2
1AC4B11A44300B
S7226
SYSTEM
DEL NAP
S7224
S7223
S7218
S7219
S7221
TR-
TR+
ATR
VR721
PICTURE
S7204
S7225
EJECT
CN722
CN721
Q7204

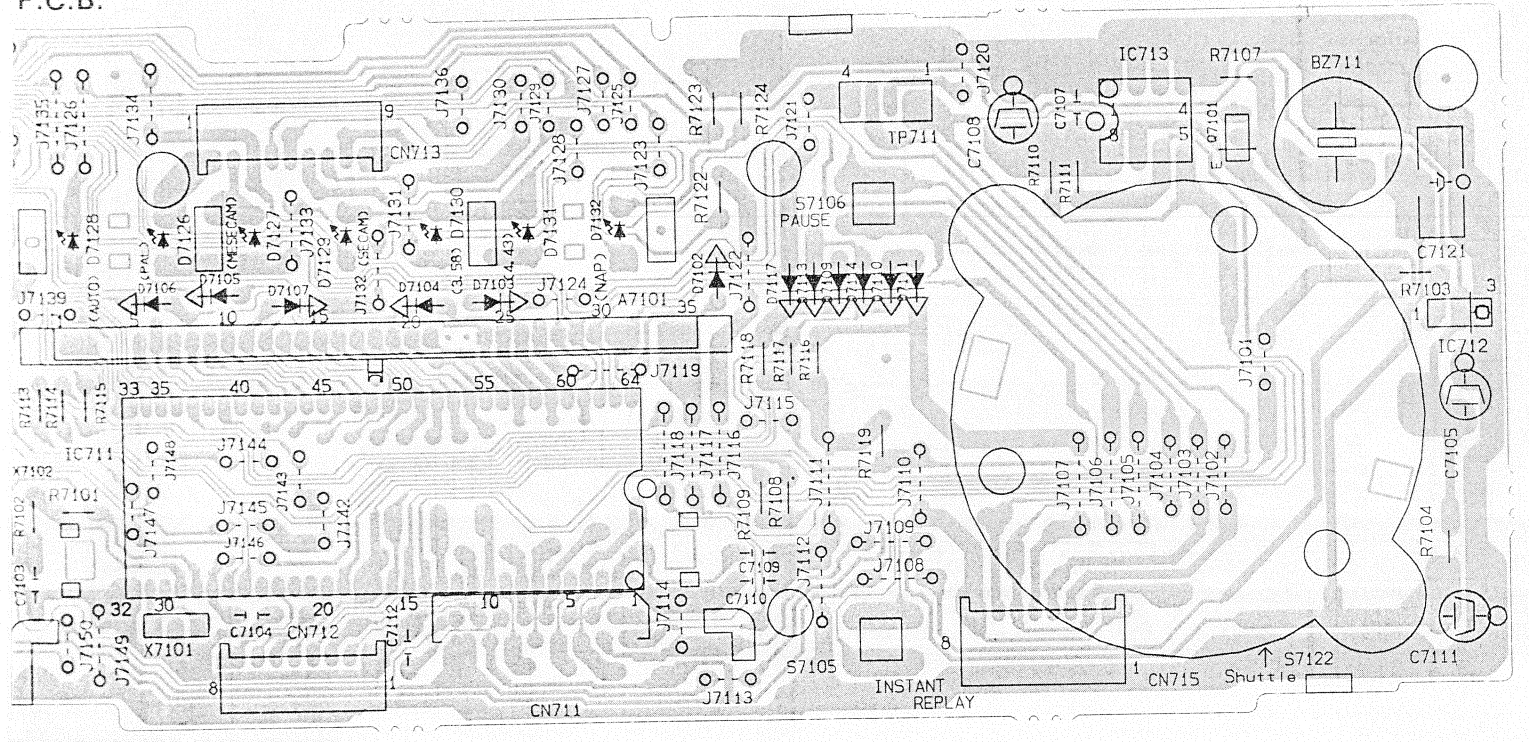
TM-3 P.C.B.


1AC4B11A44400B
TM-3
CN731
POWER
S7303
D7333
R7326
D7334
R7327
JCI-N1S

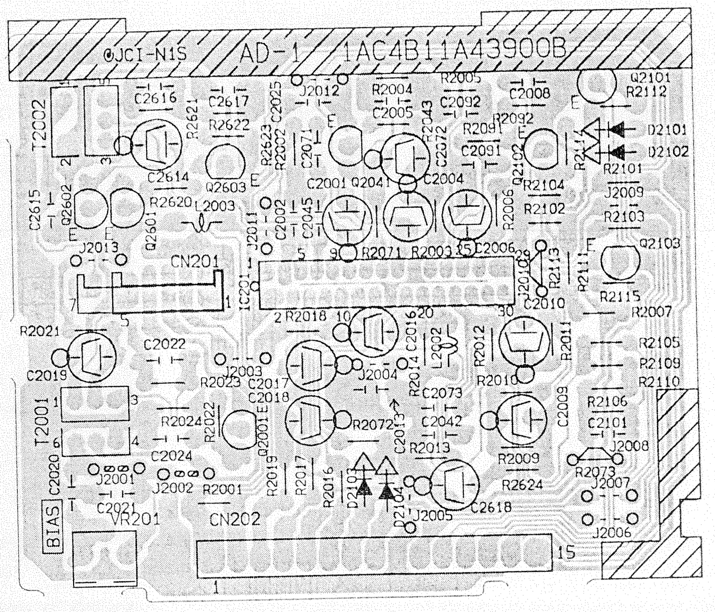

T2001
J2002
C2019
CN201
GND
R/P HEAD
R/P HEAD
FE.AE
GND
TO MC-5
IC201
LA7295
AUDIO R/P
CURRENT PROTECTOR
REC
FE
PB
REC/EE CONT.
C2018
R2019
L2003
R2001

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

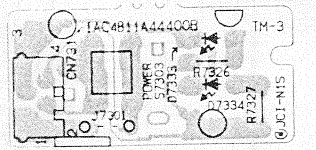
P.C.B.


CN713
CN712
CN711
CN715
IC711
IC712
IC713
BZ711
X7101
A7101
S7105
S7106
PAUSE
S7122
Shuttle
INSTANT
REPLAY
TP711

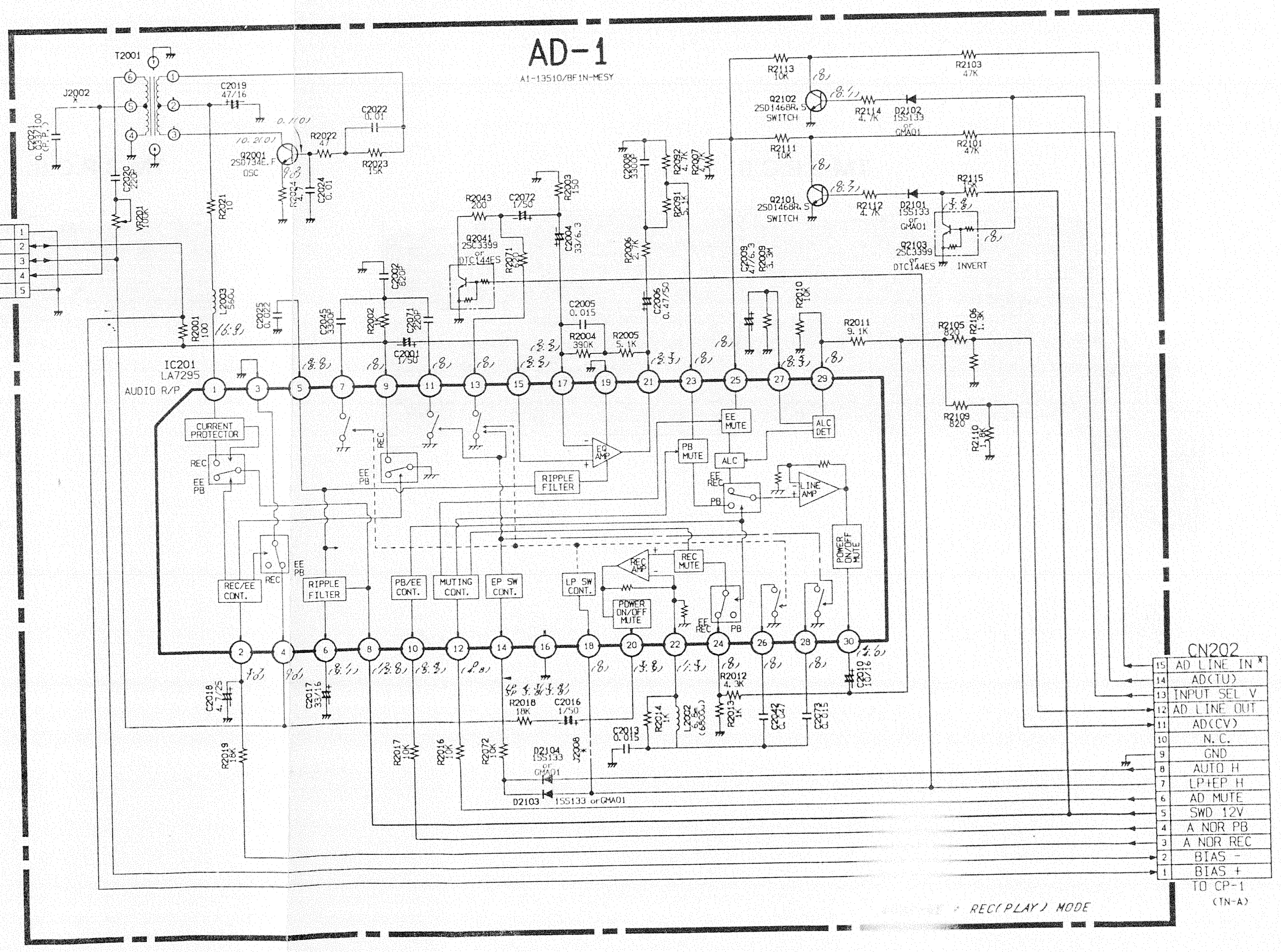
AD-1 P.C.B.


JCI-N1S
AD-1
1AC4B11A43900B
CN201
CN202
IC201
T2001
VR201
BIAS

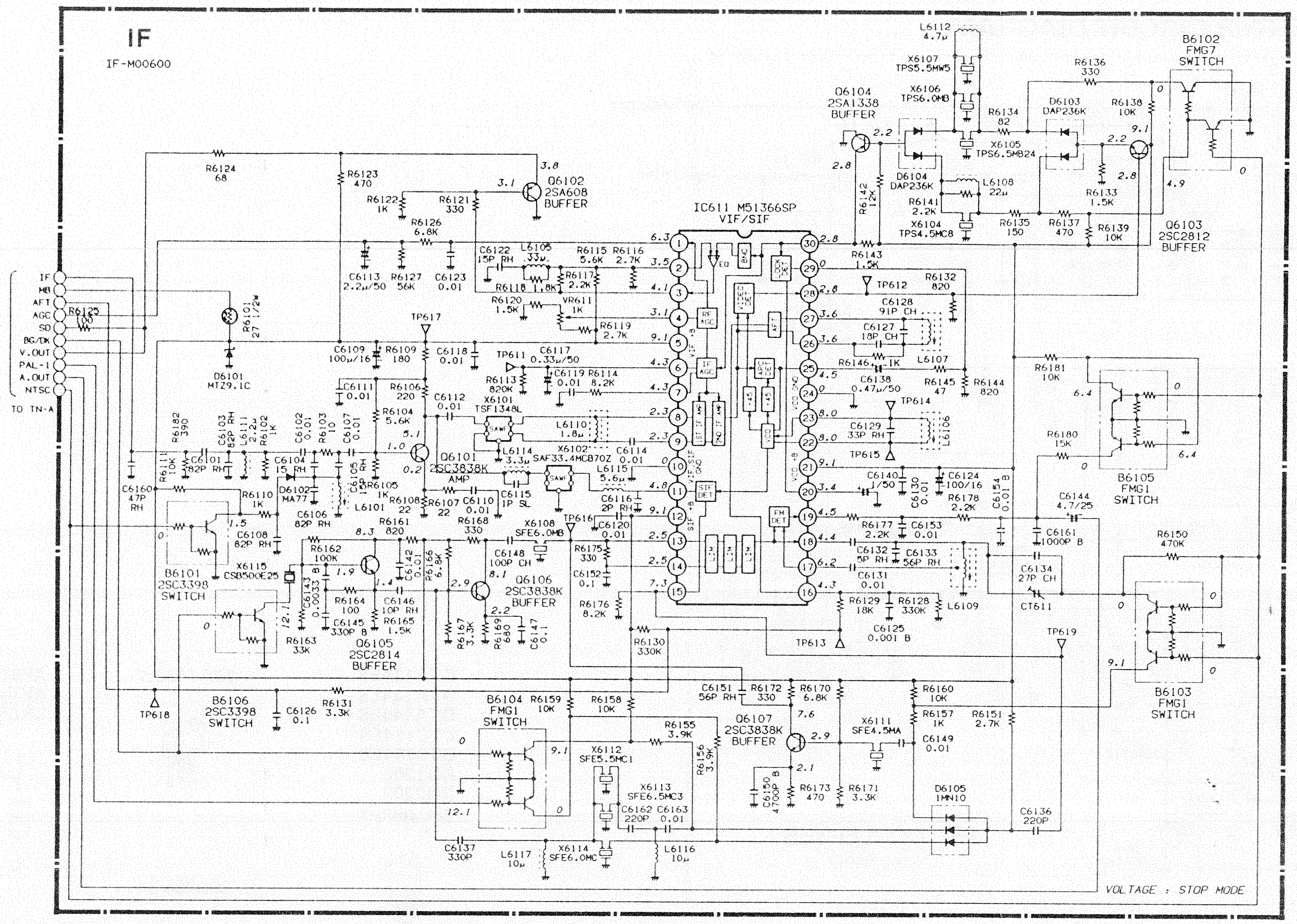
TM-3 P.C.B.


1AC4B11A44400B
TM-3
CN731
POWER
S7333
D7334
JCI-N1S

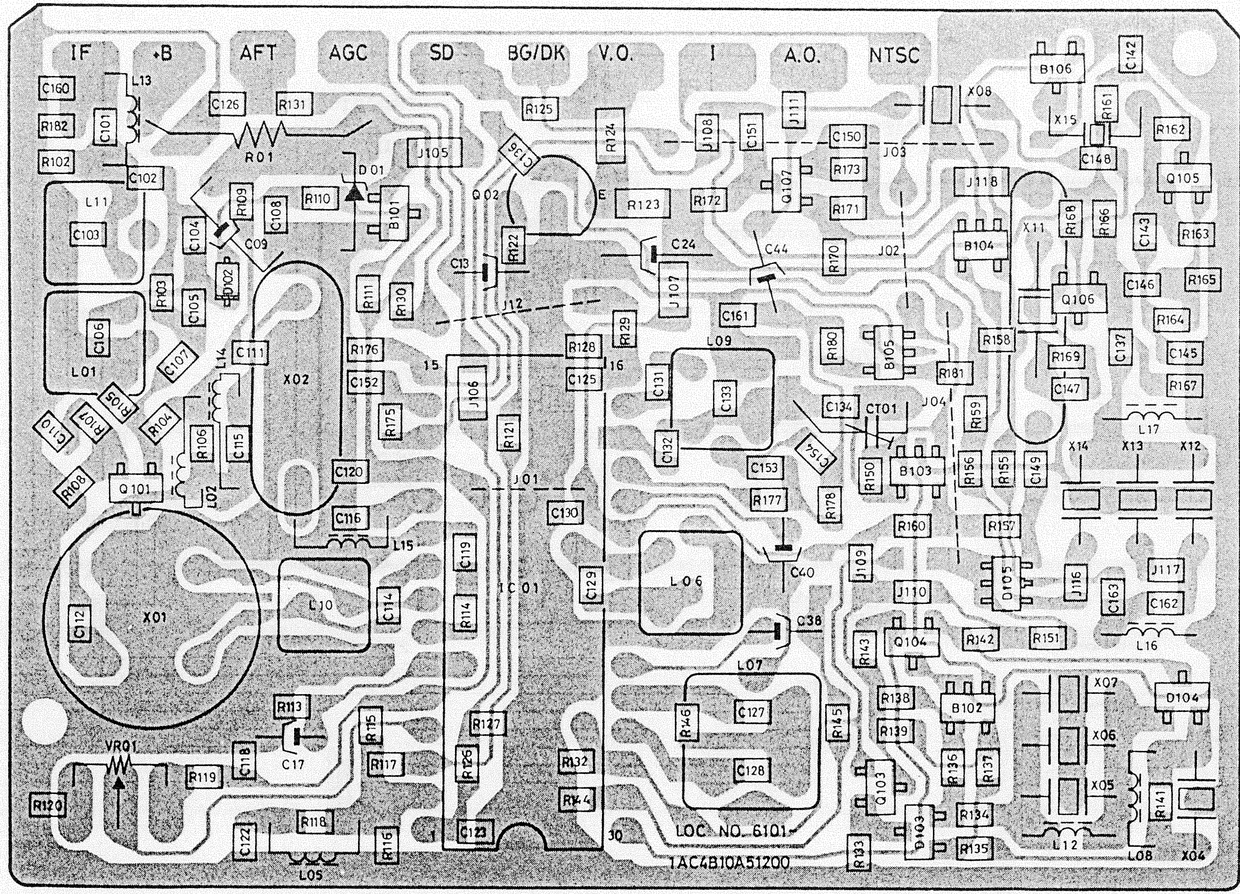
AD-1 BOARD AUDIO R/P CIRCUIT DIAGRAM


AD-1
CN201
GND
R/P HEAD
R/P HEAD
FE.AE
GND
TO MC-5
T2001
J2002
Q2001
OSC
IC201
LA7295
AUDIO R/P
CURRENT PROTECTOR
RIPPLE FILTER
REC/EE CONT.
PB/EE CONT.
MUTING CONT.
EP SW CONT.
LP SW CONT.
POWER ON/OFF MUTE
REC MUTE
EE MUTE
PB MUTE
ALC
ALC DET
LINE AMP
Q2102
SWITCH
Q2101
SWITCH
Q2103
INVERT
D2103
CN202
15 AD LINE IN
14 AD(TU)
13 INPUT SEL V
12 AD LINE OUT
11 AD(CV)
10 N.C.
9 GND
8 AUTO H
7 LP+EP H
6 AD MUTE
5 SWD 12V
4 A NOR PB
3 A NOR REC
2 BIAS -
1 BIAS +
TO CP-1
(TN-A)
REC(PLAY) MODE

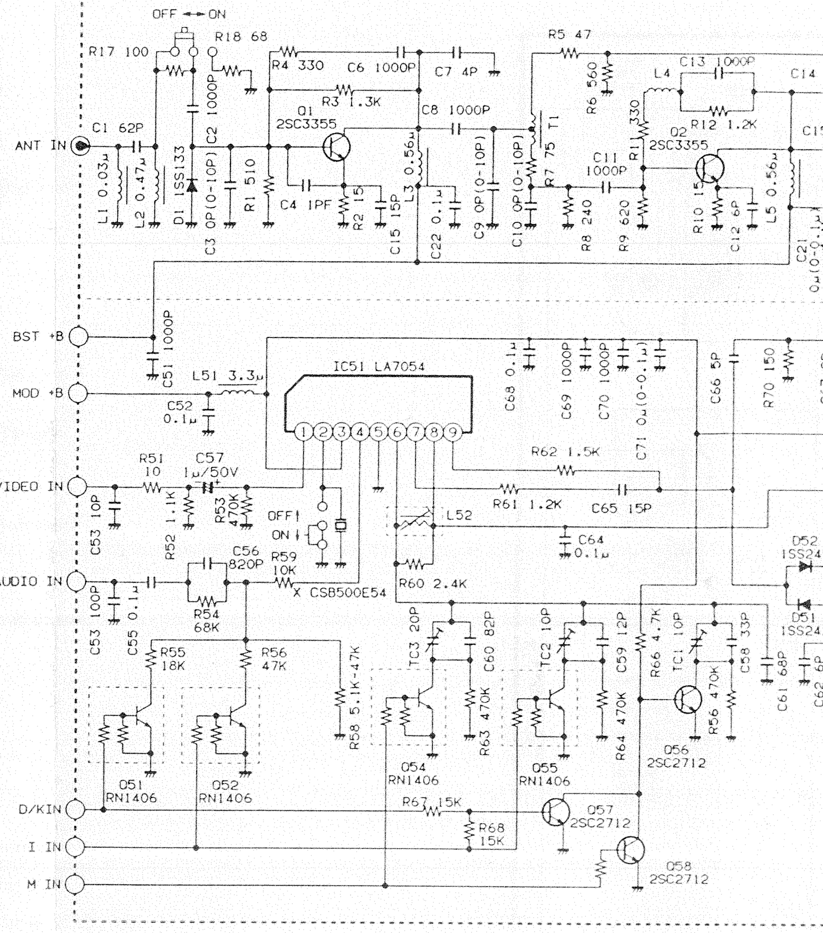
IF CIRCUIT DIAGRAM


IF
IF-M00600
IC611 M51366SP
VIF/SIF
Q6101 2SC3838K AMP
Q6102 2SA608 BUFFER
Q6103 2SC2812 BUFFER
Q6104 2SA1338 BUFFER
Q6105 2SC2814 BUFFER
Q6106 2SC3838K BUFFER
Q6107 2SC3838K BUFFER
B6101 2SC3398 SWITCH
B6102 FMG7 SWITCH
B6103 FMG1 SWITCH
B6104 FMG1 SWITCH
B6105 FMG1 SWITCH
B6106 2SC3398 SWITCH
D6101 MTZ9.1C
D6105 1MN10
IF
MB
AFT
AGC
SD
BG/DK
V.OUT
PAL-I
A.OUT
NTSC
TO TN-A
VOLTAGE : STOP MODE

IF P.C.B.

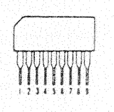

IF
+B
AFT
AGC
SD
BG/DK
V.O.
I
A.O.
NTSC
LOC NO. 6101
1AC4B10A51200

RF CONVERTER CIRCUIT DIAG

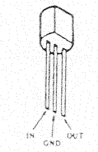

OFF ↔ ON
ANT IN
BST +B
MOD +B
VIDEO IN
AUDIO IN
D/KIN
I IN
M IN
IC51 LA7054
Q1 2SC3355
Q2 2SC3355
Q51 RN1406
Q52 RN1406
Q54 RN1406
Q55 RN1406
Q56 2SC2712
Q57 2SC2712
Q58 2SC2712
X CSB500E54

SEMICONDUCTOR LEAD LAYOUTS

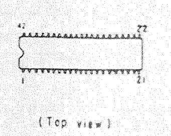
BA7021
LA7910



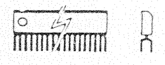
L5431



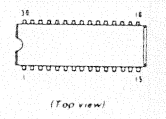
LA7395



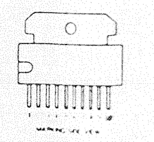
BA7025L



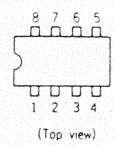
BA7107S
LA7124
LA7374



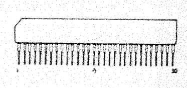
LB1641



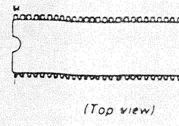
BA7046
FA5304P
LC8992
ST24C01B1

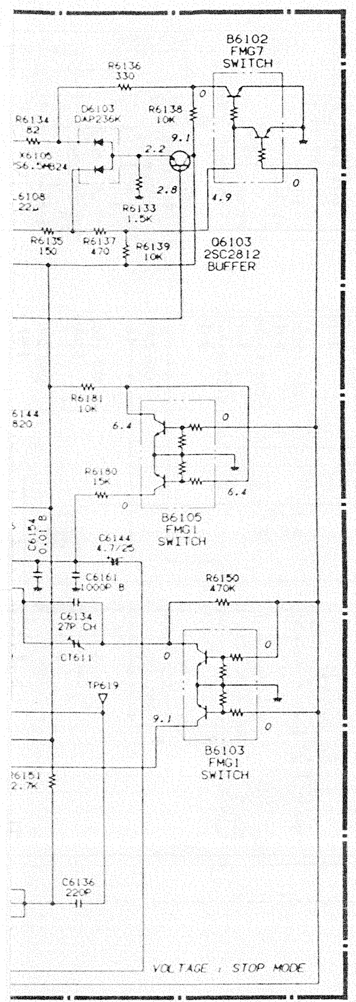

8 7 6 5
1 2 3 4
(Top view)

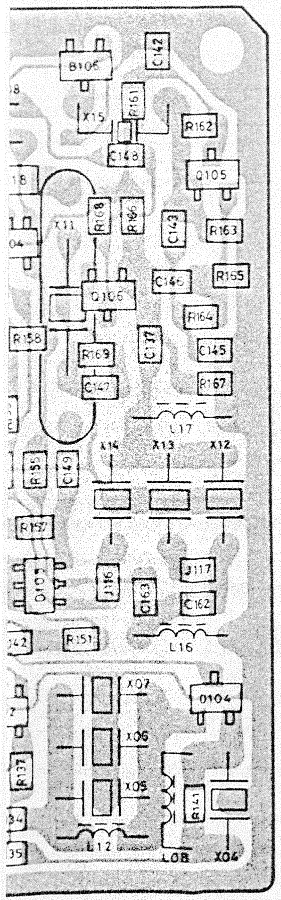
LA7295



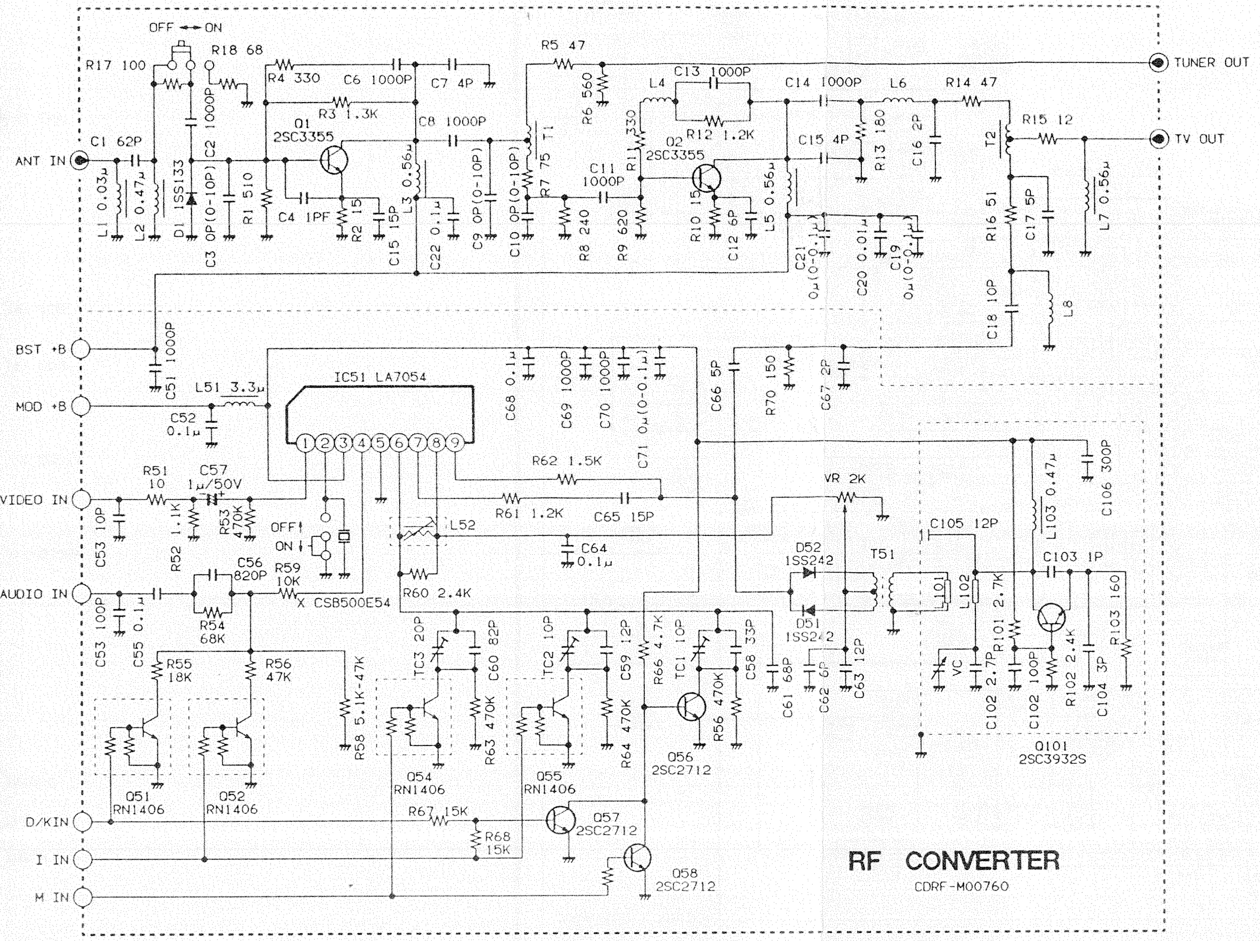
M38102M4-602S




B6102
FMG7
SWITCH
R6136 330
R6134 82
D6103 DAP236K
R6138 10K
9.1
2.2
2.8
4.9
R6133 1.5K
R6135 150
R6137 470
R6139 10K
Q6103
2SC2812
BUFFER
R6181 10K
R6144 820
6.4
R6150 15K
B6105
FMG1
SWITCH
C6144 4.7/25
C6161 1000P B
C6134 27P CH
CT611
R6150 470K
TP619
B6103
FMG1
SWITCH
9.1
C6136 220P
VOLTAGE : STOP MODE

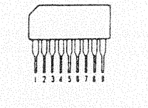

B106
X15
C142
C148
R162
Q105
X11
R161
C143
R163
C145
R165
Q106
R164
R158
R169
C137
C147
R167
L17
X14
X13
X12
R157
J116
J117
Q102
R153
C162
L16
R151
X07
Q104
X06
X05
R141
L12
L08
X04

RF CONVERTER CIRCUIT DIAGRAM

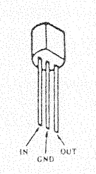

OFF ◄► ON
R17 100
R18 68
R4 330
C6 1000P
C7 4P
R5 47
L4
C13 1000P
C14 1000P
L6
R14 47
TUNER OUT
TV OUT
ANT IN
C1 62P
R3 1.3K
Q1 2SC3355
C8 1000P
R6 560
Q2 2SC3355
R12 1.2K
C15 4P
R13 180
C16 2P
R15 12
T1
T2
L1 0.03μ
L2 0.47μ
D1 1SS133
C3 0P(0-10P)
C2 1000P
R1 510
C4 1PF
R2 15
C15 15P
L3 0.56μ
C22 0.1μ
C9 0P(0-10P)
C10 0P(0-10P)
R7 75
R8 240
R9 620
R11 330
C11 1000P
R10 15
C12 6P
L5 0.56μ
C21 0μ(0-0.1μ)
C20 0.01μ
C19 0μ(0-0.1μ)
R16 51
C17 5P
L7 0.56μ
C18 10P
L8
BST +B
MOD +B
C51 1000P
L51 3.3μ
C52 0.1μ
IC51 LA7054
C68 0.1μ
C69 1000P
C70 1000P
C71 0μ(0-0.1μ)
C66 5P
R70 150
C67 2P
VIDEO IN
R51 10
C57 1μ/50V
R62 1.5K
VR 2K
R61 1.2K
C65 15P
L52
OFF
ON
C53 10P
R52 1.1K
R53 470K
C105 12P
L103 0.47μ
C106 300P
C64 0.1μ
D52 1SS242
T51
C103 1P
AUDIO IN
C56 820P
R59 10K
X CSB500E54
R60 2.4K
L101
L102
R101 2.7K
R103 160
C53 100P
C55 0.1μ
R54 68K
R55 18K
R56 47K
TC3 20P
C60 82P
TC2 10P
C59 12P
R66 4.7K
TC1 10P
C58 33P
D51 1SS242
C63 12P
VC
C101 2.7P
C102 100P
R102 2.4K
C104 3P
R58 5.1K-47K
R63 470K
R64 470K
R56 470K
C61 68P
C62 6P
C102
C104
Q101 2SC3932S
Q51 RN1406
Q52 RN1406
Q54 RN1406
Q55 RN1406
Q56 2SC2712
D/K IN
R67 15K
R68 15K
Q57 2SC2712
I IN
Q58 2SC2712
M IN
RF CONVERTER
CDRF-M00760

SEMICONDUCTOR LEAD LAYOUTS

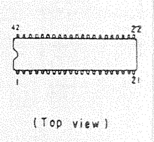
BA7021
LA7910



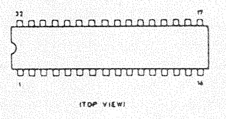
L5431



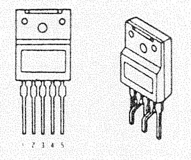
LA7395


42
22
1
21
(Top view)

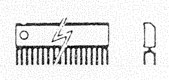
M50554-281SP



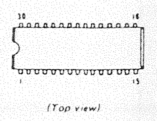
SI-3120CA



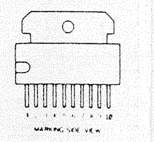
BA7025L



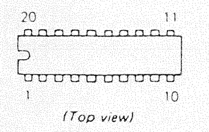
BA7107S
LA7124
LA7374


16
1
15
(Top view)

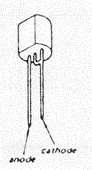
LB1641



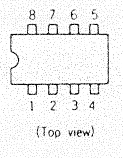
M52063SP


20
11
1
10
(Top view)

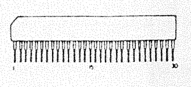
μPC574J


anode
cathode

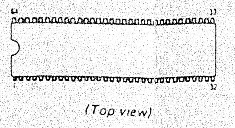
BA7046
FA5304P
LC8992
ST24C01B1


8 7 6 5
1 2 3 4
(Top view)

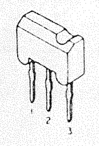
LA7295



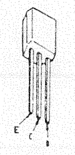
M38102M4-602SP



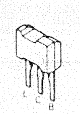
MN1280-L
MN1280-S



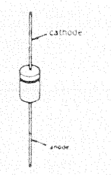
DTA114ES
DTA124ES
DTA144ES
DTC114ES
DTC144ES
RN1202
RN2202
2SC2608-Y



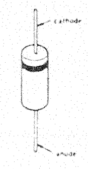
2SA1428-Y



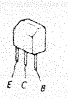
AP01C-V0
AK04-V2
ERC81-004


cathode
anode

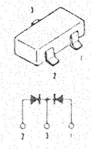
RL4ZLF-M1


cathode
anode

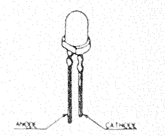
2SB734-34



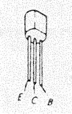
MA152WK



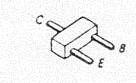
SEL2410G-D


anode
cathode

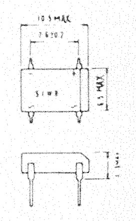
2SA1015-GR
2SC458K
2SD734-E
2SD1468S-S



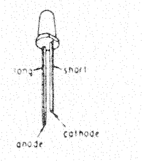
2SC1009A-FA4



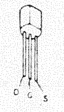
S1WBA60



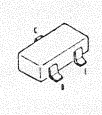
MPG3868S-J85K


long
short
anode
cathode

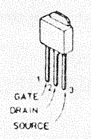
2SK1104-P



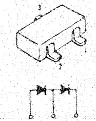
2SA1162-G
2SA1464-Y13
2SC2712-YG
2SC2812-L5
2SC3395
2SC3398



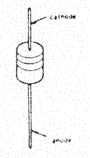
2SK1460-YA


GATE
DRAIN
SOURCE

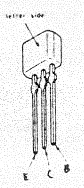
1SS226



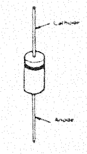
MTZJ-5.1C
MTZJ-30A
RD3.6ES-B1
RD5.6ES-B2
RD6.8ES-B2
RD8.2ES-B2
RD9.1ES-B2
RD18ES-B2
1SS119
1SS120


cathode
anode

2SA1175-HFE
2SC2785-HFE



1SS83


cathode
anode

IC301 SYSTEM CONTROL & DIGITAL SERVO MPU PIN FUNCTIONS TABLE

No.	Name	I/O	I/O Signal Function
1	D-PG	I	Drum PG pulse input.
2	S-DATA IN	I	Terminal for communication of mode data with other microprocessors.
3	S-DATA OUT	O	Data is 8bitX12 block serial data.
4	SSB CLCK	O	The clock pulse is output from this microprocessor.
5	INSERT ON/OFF	I	Insert function ON/OFF terminal.
6	ENV SW	I	Video head selection signal (PB envelop detection signal) input for 4-head special playback.
7	DOC	I	Drop out detection pulse input. Used for absorbing STILL noise for 2Head model.
8	C-FG 2.	I	Capstan motor FG-2 signal input. Used for brake timing control at slow mode.
9	C-FG 1.	I	Capstan motor FG-1 signal input. (Capstan speed control)
10	D-FG	I	Head drum motor FG signal input. (Drum speed control)
11	PB CTL P.	I	CTL head playback pulse input.
12	COMP SYNC	I	Composite sync signal input.
13	RF SW P.	O	Output of RF switching pulse created by head drum PG.
14	AF SW P.	O	Output of Hi-Fi (FM) audio head switching pulse created by head drum PG.
15	VD P	O	Dummy VD (V LOCK) pulse output at special playback mode.
16	REC CTL	O	Recording control (CTL) signal output.
17	DRUM PWM	O	Head drum motor rotation (speed/phase) control signal output. (Signal as Pulse Width Moduration)
18	CAP PWM	O	Capstan motor rotation (speed/phase) control signal output. (Signal as Pulse Width Moduration)
19	A-VSS	-	Ground terminal for internal A/D converter.
20	AV REF	I	Reference voltage input for internal A/D converter.
21	AF ENV	I	Hi-Fi (FM) audio head envelope detection signal input for ATR function.
22	VD ENV	I	Video head envelope detection signal input for ATR function.
23	D-PG MM	I	CR for drum PG pulse delay. (Head switching position adjustment.)
24	SLOW TRK CR	I	CR for slow tracking adjustment".
25	DEW S.	I	Dew sensor input terminal.
26	OPTION	I	Terminal to alter internal specifications. (Set up voltage : 0V for 2Head model and 5.0V for regular 4Head model)
27	T.TOP S.	I	Sensor signal input for tape beginning detection.
28	T.END S.	I	Sensor signal input for tape end detection.
29	RESET	I	Initial reset terminal for this IC.
30	VDD	-	IC power supply input. (5Vdc)
31	X2	-	IC clock OSC terminal.
32	X1	-	Frequency is 12MHz.
33	VSS	-	Ground terminal
34	H AMP SW	O	Video head amplifier (SP/LP head or SUB head) selection signal output. (4/3 HEAD models)
35	ROTARY	O	Chroma phase control signal output for 4/3 head models.
36	VD REC	O	Recording indication signal. Used for equiped rotary erase head models.
37	-	-	-
38	CTL GAIN DOWN	O	CTL head AMP gain control signal output.
39	-	-	-
40	CAP F/R	O	Capstan motor forward/revers control.
41	DRUM P	O	Outputs the drum jitter compensation in the slow mode.
42	CAP STR/STP	O	Outputs the capstan motor start and brake pulses in the slow mode.
43	REMARK	O	Output the control (CTL) signal re-recording control signal. Three-value output (H, M, L).
44	FE CTL	O	Output the rotary erase head ON/OFF control.
45	ANT/VIDEO	O	Antenna through or video deck RF output select (Video when LOW).
46	-	-	-
47	LP H	O	"HIGH" output when tape speed is set to LP mode.
48	POWER UP	O	"HIGH" output except when power is off. Indicating that power is ON.
49	SPECIAL PB	O	Output in special playback modes (R/F-SEARCH, STILL and SLOW).
50	PB H	O	Signal indicating playback mode.
51	REC	O	Signal indicating recording mode.
52	INPUT SEL. V	O	Signal for selecting video input signal.
53	INPUT SEL. A	O	Signal for selecting audio input signal.
54	-	-	-
55	-	-	-
56	A.DUB	O	Signal indicating audio dubbing mode.
57	A MUTE	O	Signal disable Hi-Fi audio signal output.
58	-	-	-
59	A NOR REC	O	Signal indicating normal audio recording.
60	A NOR PB	O	Signal indicating normal audio playback.
61	ML-M	O	Loading motor rotation speed (medium speed) indication signal.
62	ML-L	O	Loading motor rotation speed (low speed) indication signal.
63	ML-R	O	Loading motor rotation direction (REV) indication signal.
64	ML-F	O	Loading motor rotation direction (FWD) indication signal.
65	FF+REW	O	Signal indicating FF or REW modes.
66	SP L	0	" LOW " output when tape speed is set to SP mode.
67	VSS	-	IC ground terminal.
68	-	I	Normaly pull-up 5Vdc.
69	SP/LP	O	"LOW" output when tape speed is set to SP mode. "HIGH" is set to LP mode.
70	EDIT IN	I	Edit mode control terminal.
71	SW DATA 0	I	3-bit data indicating operation position of mechanism.
72	SW DATA 1	I	
73	SW DATA 2	I	
74	FL-START SW	I	Switch input indicating start of cassette loading or discharge by cassette mechanism.
75	SAFETY SW	I	Input terminal for accidental erasur prevention switch. No operation to recording mode while "LOW" is input.
76	-	-	-
77	VDD	-	IC power supply terminal. (5Vdc)
78	T.REEL P.	I	Pulse input for detection of take-up reel table rotation.
79	S.REEL P.	I	Pulse input for detection of supply reel table rotation.
80	-	-	-

BF4_92SY

IC711 (M38102M4) TIMER MPU PIN FUNCTIONS TABLE

No.	Name	I/O	I/O Signal Function
1	VCC	-	IC power supply input. (5 Vdc)
2	VEE	I	- 30 V input for display (FLD) drive.
3	I/BG	O	PAL transmission system switching ("L"=PAL I ; "H"=PAL BG)
4	AFT C	I	AFT S-curve input terminal.
5	H. SYNC	I	Horizontal sync detection signal input for exsistence channel discrimination.
6	BAND 1	O	Tuning band data output(BAND1,BAND2).
7	BAND 2	O	(L,L) = VHF-LOW , (L,H) = VHF-HIGH, (H,L) = UHF, (H,H) = SKIP
8	AUDIO MUTE	O	"H" output (Audio Signal Mute) during tuning period..
9	VIDEO MUTE	O	"H" output (Video Signal Mute) during tuning period.
10	PWM	O	Tuning voltage output (PWM signal).
11	OSD CS	O	Chip enable (access) signsl output to OSD IC.
12	OSD CLK	O	The clock pulse is output from this microprocessor.
13	OSD DATA	O	Data transmission to OSD IC.
14	E2PROM / VPS SCL	O	Clock shignal for E2PR0M IC and VPS decoder IC.
15	E2PROM / VPS SDA	I/O	Data exchange with the E2PROM IC and the VPS decoder IC.
16	SSB CLK	I	Terminal for communication of mode data with other MPU.
17	SSB SDA OUT	O	The clock pulse is input from system control MPU.
18	SSB SDA IN	I	Data is 8bit X 12 block serial data.
19	BUZZER	0	Miss operation buzzer drive.
20	BLUE BACK ON	O	Blue back ON / OFF indicating signal output to OSD circuit.
21	-	-	-
22	-	-	-
23	B. C. ON/OFF	O	Background color (BLUE/GRAY) selection signal output to OSD IC.
24	-	-	-
25	POWER DOWN	I	Power failuer mode set at "L" input.
26	REMOCON.	I	Remote control signal input.
27	RESET	I	Initial reset terminal for this IC. Reset when "LOW".
28	XC IN	-	IC clock OSC used in the power failure mode.
29	XC OUT	-	Frequency is 32.768 kHz.
30	X IN	-	IC clock OSC terminal.
31	X OUT	-	Frequency is 4 MHz.
32	VSS	-	IC Ground terminal.
33	KEY IN 4	I	Operation key data inputs.
34	KEY IN 3	I	
35	KEY IN 2	I	
36	KEY IN 1	I	
37	ATR LED	0	ATR LED indcator drive.
38	-	-	-
39	AFT MUTE	O	"H" output during TU AFT mute.
40	SEG p	O	Display segment outputs (FLD). (Included key-scan output)
41	SEG o	O	
42	SEG n	O	
43	SEG m	O	
44	SEG l	O	
45	SEG k	O	
46	SEG j	O	
47	SEG i	O	
48	G9	O	Display grid outputs (FLD).
49	G8	O	
50	G7	O	
51	G6	O	
52	G5	O	
53	G4	O	
54	G3	O	
55	G2	O	
56	G1	O	
57	SEG h	O	Display segment outputs (FLD). (Included key-scan output)
58	SEG g	O	
59	SEG f	O	
60	SEG e	O	
61	SEG d	O	
62	SEG c	O	
63	SEG b	O	
64	SEG a	O	

TMBF_VOS

SECTION 5
MECHANISM SERVICE TECHNICAL INFORMATIONS

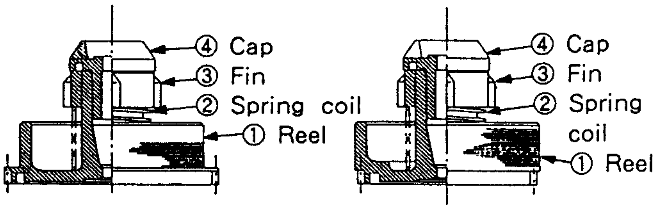
1. OUTLINE OF P92 MECHANISM

P92 mechanism is used for video tape recorders shipped as new product of 1992.
The P92 mechanism has the same basic structures as the P90 mechanism shipped in 1990 except below contents. As this manual omits the description of the same contents with P90, please refer to the P90 Mechanism Service Technical Information.

Note: (8) to (10) of the followings have been already changed in "P91 mechanism" and repeated in " SUPPLEMENT of P91 mechanism".

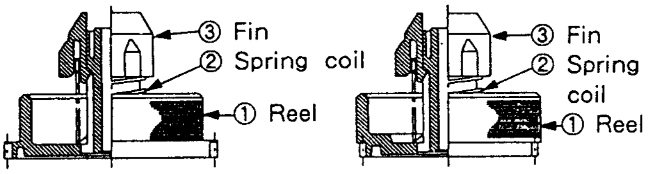
(1) The five components of the reel drive system, supply reel table, take up reel table, reel gear (S), reel gear (T) and COMPL idler clutch, are replaced with those of new one to prevent picture-shifting in the R-search.

As shown in the figure 1-a and 1-b, there are two types of the supply reel table and take up reel table used for the model produced in 1992. One is an old reel table with a cap and fin in the figure 1-a, and the other is a new reel table of monolithic construction without a cap in the figure 1-b.
The colour of the new supply reel table and take up reel table are different from the old ones for identification. The colours of the new and old reel tables are described in the table 1 below.



SUPPLY REEL TABLE TAKE UP REEL TABLE

Fig. 1-a Old



SUPPLY REEL TABLE TAKE UP REEL TABLE

Fig. 1-b New

Note: Five parts of the reel driving system are the supply reel table, take up reel table, reel gear (S), reel gear (T) and COMPL idler clutch.

Mechanism		Supply Reel Table			Take up Reel Table			Remarks
		①	③	④	①	③	④	
A	Old reel of P92 mechanism	Light Blue	Black	White	Light Blue	White	White	A is interchangeable with B and C, if changing the entire 5 components of the reel drive system. In other cases, it has no interchangeability.
	New reel of P92 mechanism	White	Light Blue	–	White	Green	–	
B	Old reel of P88, P89, P90 and P91 mechanism	White	White	White	White	White	White	B cannot be used for A and B.
	New reel of P88, P89, P90 and P91 mechanism	White	Black	–	White	White	–	
C	Old reel of P90 S-VHS mechanism	Gray	Black	White	Gray	White	White	C is interchangeable with A, if changing the entire 5 components of the reel drive system. In other cases, it has no interchangeability.

Refer to the figure 1-a and 1-b for No.①,③ and ④.
The old and new are discriminated by the colour of ① reel, ③ fin and ④ cap.

Table 1

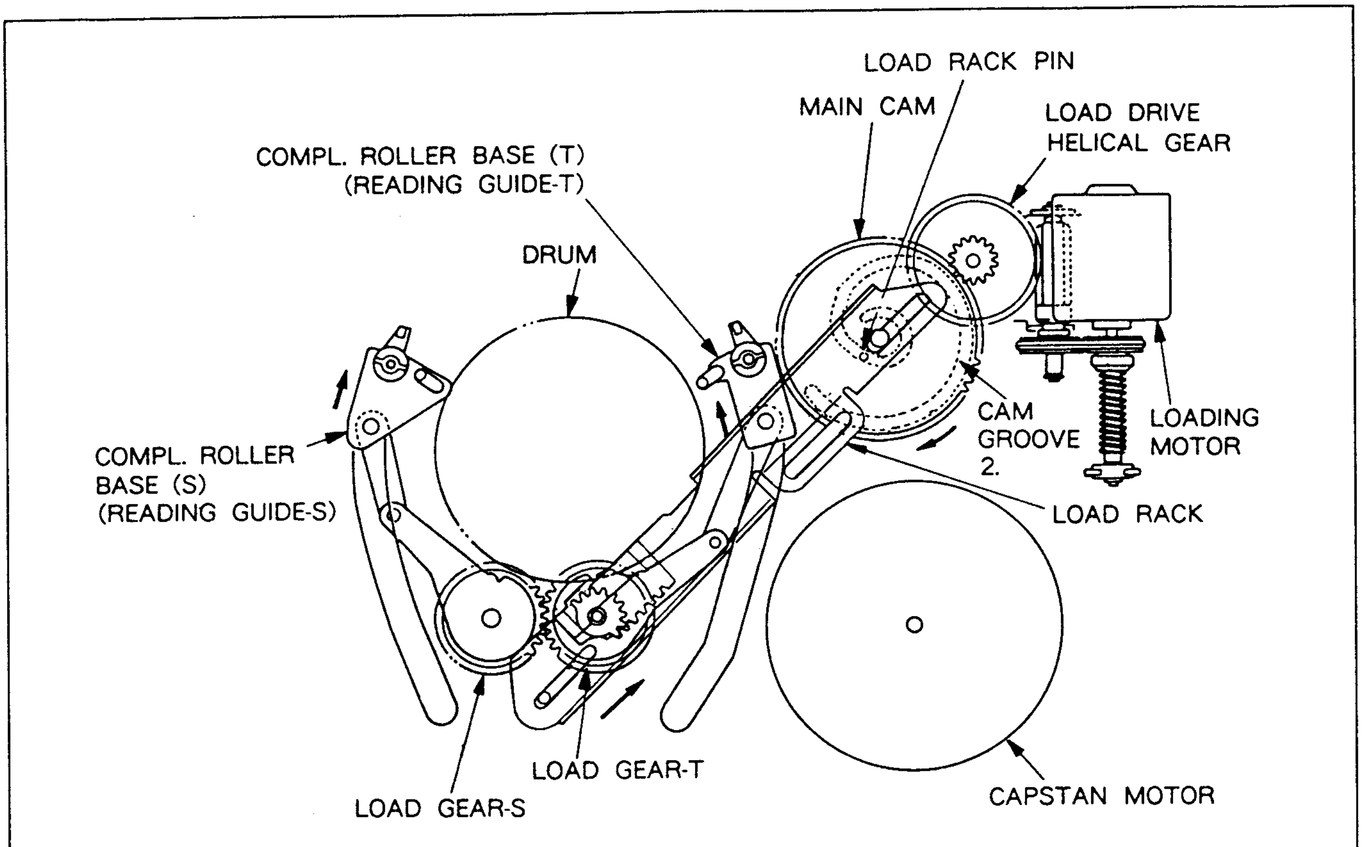

LOAD RACK PIN
MAIN CAM
LOAD DRIVE HELICAL GEAR
COMPL. ROLLER BASE (T) (READING GUIDE-T)
DRUM
COMPL. ROLLER BASE (S) (READING GUIDE-S)
CAM GROOVE 2.
LOADING MOTOR
LOAD RACK
LOAD GEAR-T
LOAD GEAR-S
CAPSTAN MOTOR

Fig. 2-1 CONSTRUCTION OF TAPE LOADING MECHANISM

(2) The main cam gear, load rack COMPL and load (T) are replaced with new ones to more simplify the tape loading mechanism. Therefore, the load cam lever of the old mechanism is not required. The new tape loading mechanism is shown in the figure 2-1.

(3) In compact size model (width : 360mm), the MC-2 and MC-3 boards between the loading motor and system control circuit are replaced with new ones. Therefore, a relay board (VHJ-0089) is required for using the service tool mode selector (VHJ-0050). The new MC-2 board has the connectors of CN817 (6 Pin type) and CN818 (2 Pin type) at the both sides of the CN811, and is marked "92" with large letters. The MC-2 board is mounted with one mechanical screw. As for the mid mount model, the same relay board (VHJ-0075) as P90 mechanism is used.

(4) The pulley bracket is disused and the special screw is employed. [However, the pulley bracket is used to S VHS mechanism (High speed FF/REW mechanism)]

(5) The shape of the clutch lever assembly is partially changed and the damper is disused.

(6) The shape of the front helical gear of the loading motor is partially changed and the washer is disused.

(7) The 4 screws for mounting the gear bracket assembly of the COMPL cassette mechanism are changed to 3 screws.

(8) The height adjustment of the exit side fixed guide is unnecessary by improvement in precision of the tape running system.

(9) The form of MC-1 and MC-4 board connector (CN801) near the reel drive part are changed.

(10) Auto head cleaner mechanism is used for cleaning video head automatically when loading and unloading.

Service Jigs No.
Mode selector (VHJ-0050): J-6082-050-A
Mode selector relay board (VHJ-0075): J-6090-008-A
Mode selector relay board (VHJ-0089): J-

2. DESCRIPTION OF MECHANISM OPERATION

2-1. BASIC OPERATION MODE OF MECHANISM

The P-90 mechanism has its original modes such as given in Table 2-1, in addition to the VTR is operation modes (STOP, FF, REW, PLAY, REC, R-SEARCH, F-SEARCH, STILL, SLOW, and ETS). These modes specific to the mechanism play important roles in tape protection operation at the time of a shift to various modes of the VTR above. A shift to the mode specific to the mechanism is carried out by controlling the rotation of the loading motor with the control signal of the system control circuit. The detection of important mechanism operation mode positions is done by using the FL START SWITCH for detecting the cassette ejection/insertion, and the MECHANISM MODE SWITCH for detecting each mode of the mechanism (3 bit MODE DATA is output by operating the rotary switch).

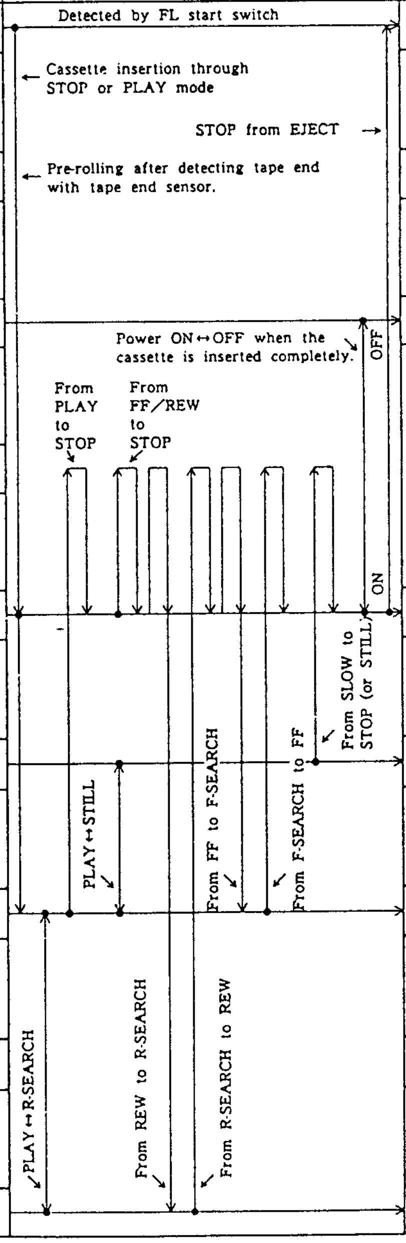
Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
	3	2	1				
EJECT	–	–	–		Eject position	 Detected by FL start switch Cassette insertion through STOP or PLAY mode STOP from EJECT Pre-rolling after detecting tape end with tape end sensor. Power ON↔OFF when the cassette is inserted completely. OFF ON From PLAY to STOP From FF/REW to STOP From SLOW to STOP (or STILL) PLAY↔STILL From FF to F-SEARCH From F-SEARCH to FF PLAY↔R-SEARCH From REW to R-SEARCH From R-SEARCH to REW	EJECT
					Front loading/Unloading		
SHORT REW	1	1	0		Take up operation in the tape end position		Low side of ⑥. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position		Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position		
BRAKE	0	0	1	①	Main brake applying position		
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)		STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.		STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode		PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position		PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SEARCH

Table 2-1

2-2. DESCRIPTION OF MECHANISM DRIVE

To realize the thin type mechanism, a loading motor and two pieces of cam (MAIN CAM GEAR and the MODE CAM GEAR) to be driven by the said motor are mounted on the upper part of the capstan motor, that was a dead space in the conventional mechanisms hitherto available, with a view to optimization of parts mounting layout. (Fig. 2-1 and Fig. 2-2.)

- IMPEDANCE ROLLER and FE HEAD are not used to the exclusive model for playback.
- The shaded sections are different from P90 mechanism.

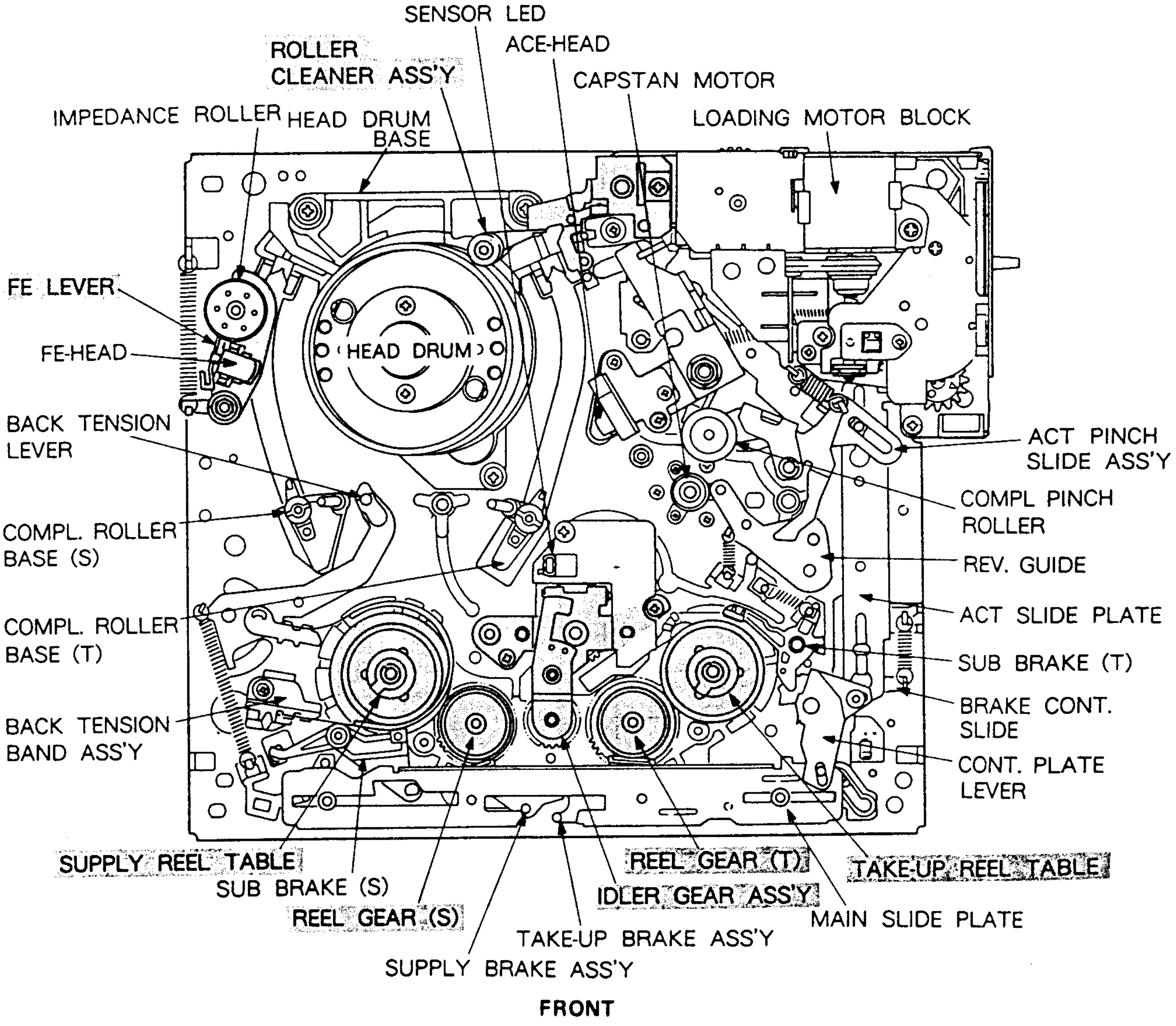

SENSOR LED
ROLLER CLEANER ASS'Y
ACE-HEAD
CAPSTAN MOTOR
IMPEDANCE ROLLER
HEAD DRUM BASE
LOADING MOTOR BLOCK
FE LEVER
FE-HEAD
HEAD DRUM
BACK TENSION LEVER
COMPL. ROLLER BASE (S)
COMPL. ROLLER BASE (T)
BACK TENSION BAND ASS'Y
ACT PINCH SLIDE ASS'Y
COMPL PINCH ROLLER
REV. GUIDE
ACT SLIDE PLATE
SUB BRAKE (T)
BRAKE CONT. SLIDE
CONT. PLATE LEVER
SUPPLY REEL TABLE
SUB BRAKE (S)
REEL GEAR (S)
REEL GEAR (T)
IDLER GEAR ASS'Y
TAKE-UP REEL TABLE
MAIN SLIDE PLATE
TAKE-UP BRAKE ASS'Y
SUPPLY BRAKE ASS'Y
FRONT

Fig. 2-1. Top View of Mechanism (Initial mode)

- Some models have no Capstan Soft Brake.
- SAFTY SWITCH is not used to the exclusive model for playback.
- The shaded sections are different from P90 mechanism.

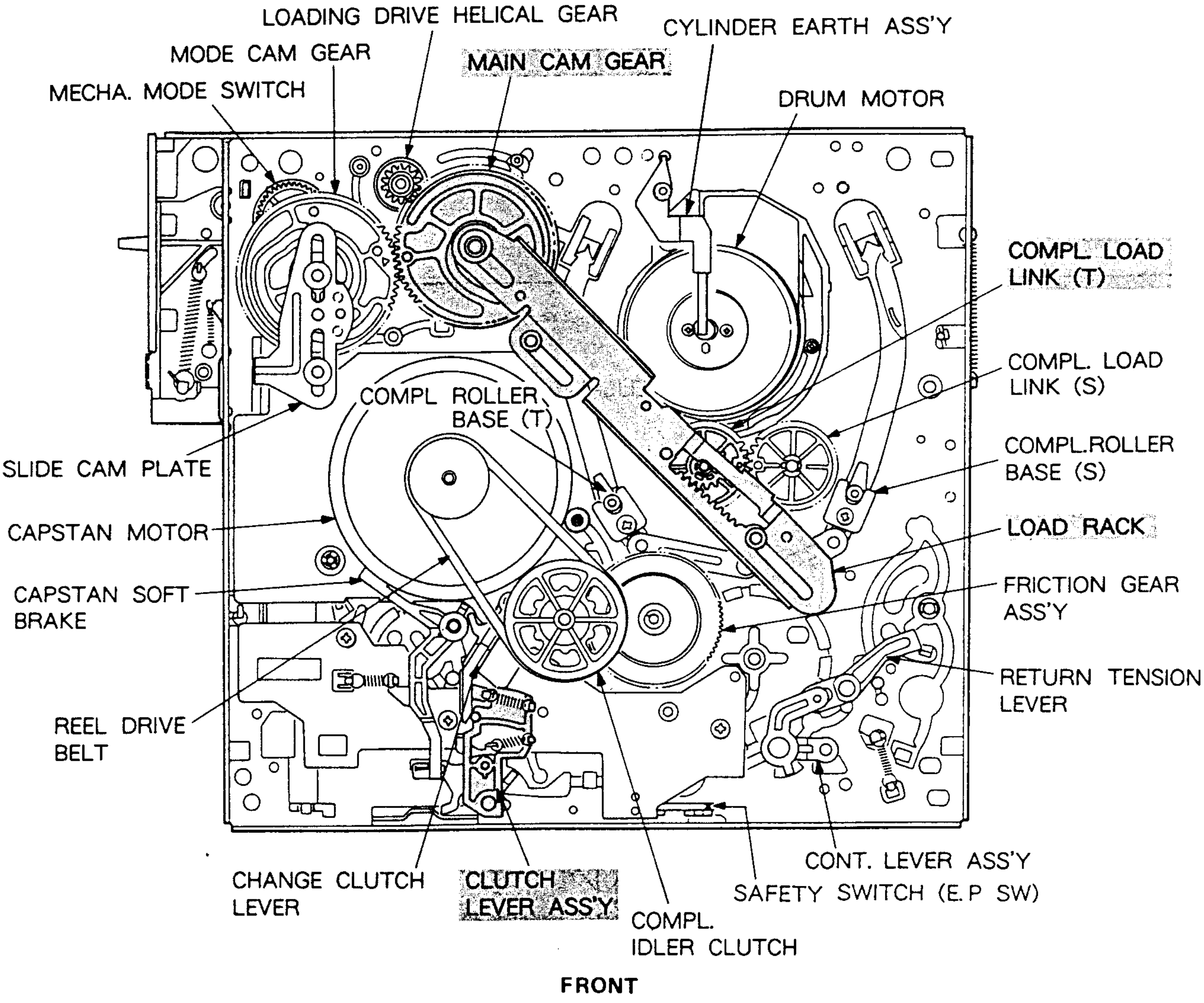

LOADING DRIVE HELICAL GEAR
CYLINDER EARTH ASS'Y
MODE CAM GEAR
MAIN CAM GEAR
MECHA. MODE SWITCH
DRUM MOTOR
COMPL. LOAD LINK (T)
COMPL. LOAD LINK (S)
COMPL ROLLER BASE (T)
COMPL.ROLLER BASE (S)
SLIDE CAM PLATE
CAPSTAN MOTOR
LOAD RACK
CAPSTAN SOFT BRAKE
FRICTION GEAR ASS'Y
RETURN TENSION LEVER
REEL DRIVE BELT
CONT. LEVER ASS'Y
SAFETY SWITCH (E.P SW)
CHANGE CLUTCH LEVER
CLUTCH LEVER ASS'Y
COMPL. IDLER CLUTCH
FRONT

Fig. 2-2. Bottom View of Mechanism (Initial mode)

These two cams have one CAM GROOVE on both sides. A total of four CAM GROOVEs performs independent functions to meet the multi-function needs of these days by driving the elements of a wide variety of functions with the motor precisely controlled by a microcomputer.
The two cams are positive motion cams having a groove over 570 degrees. These cams cause the amount of lift to be changed by a mild gradient according to the angle of rotation while synchronizedly being rotated by an outer circumferential gear to alleviate the load exerted on the cams when driving the rod linked with the cams and also to ensure position stability in each mode of operation. The geometry of each cam and that of a metal fitting of the drive section are shown in Fig. 2-3 and Fig. 2-4, respectively. Also, the role of each cam used is described below.
On the GROOVE 3 side of MODE CAM GEAR have a small gear. This small gear is engaged with the MECHANISM MODE SWITCH as shown in Fig. 2-3., and detect the mechanism operation mode. In this way, the two cams and the MECHANISM MODE SWITCH are rotated synchronously, and the mechanism is fully synchronized and driven for each mode.

MAIN CAM GEAR :	CAM GROOVE 1. Pinch roller pressing operation
	CAM GROOVE 2. Tape loading mechanical drive
MODE CAM GEAR :	CAM GROOVE 3. Brake and clutch selecting operation
	CAM GROOVE 4. Brake control and front unloading control

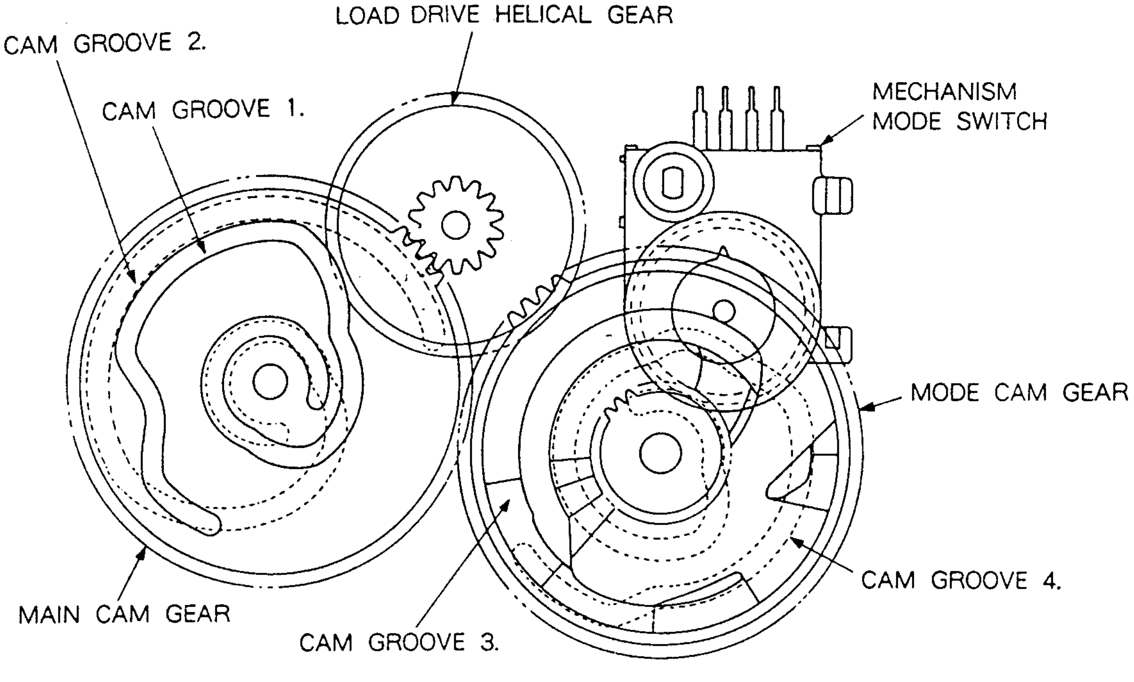


Fig. 2-3 PLAN OF CAMS CONSTRUCTION

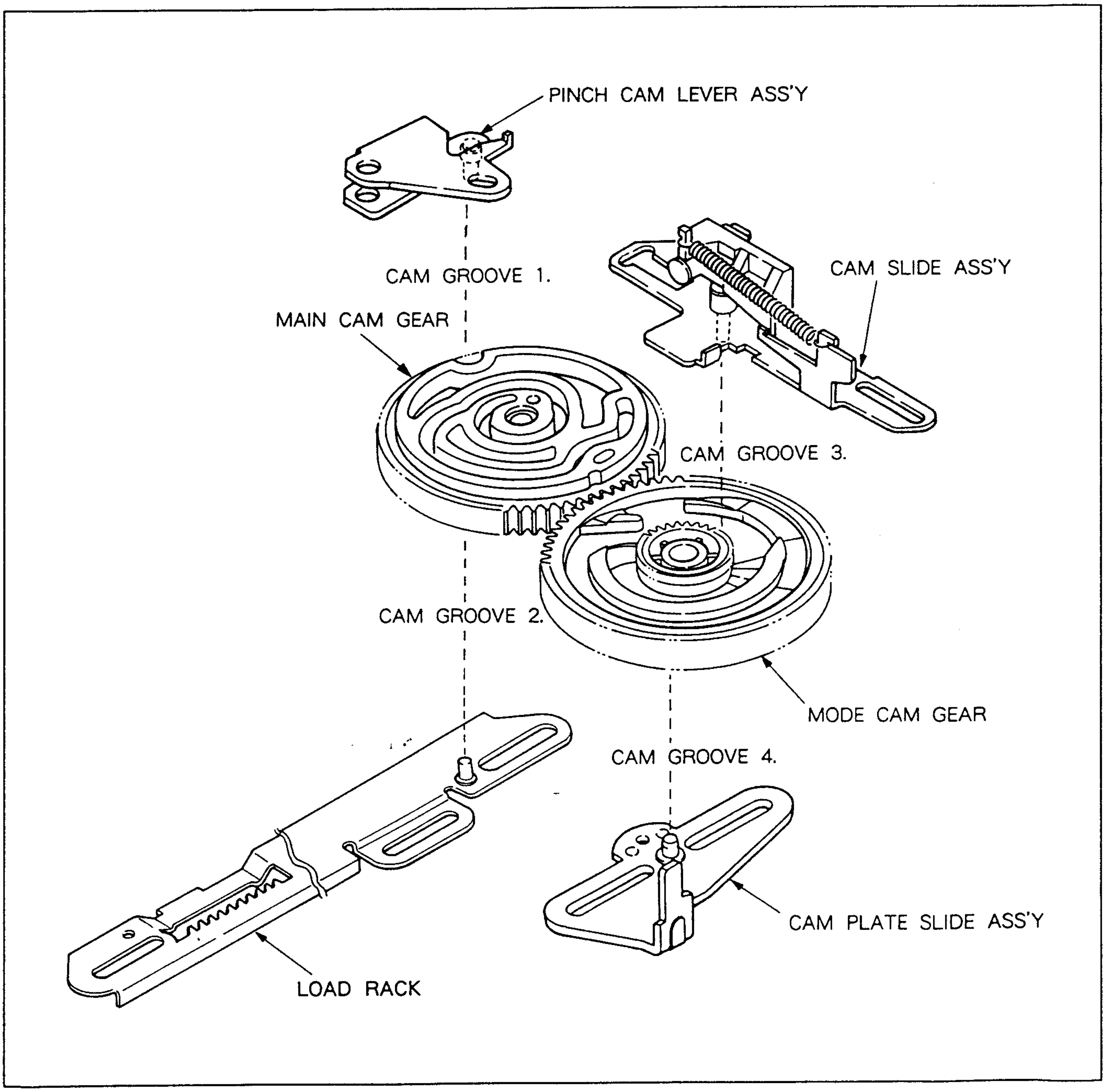

PINCH CAM LEVER ASS'Y
CAM SLIDE ASS'Y
CAM GROOVE 1.
MAIN CAM GEAR
CAM GROOVE 3.
CAM GROOVE 2.
MODE CAM GEAR
CAM GROOVE 4.
CAM PLATE SLIDE ASS'Y
LOAD RACK

Fig. 2-4. View of Cams Construction

2-2-1. Tape Loading Mechanism

The tape loading mechanism is compactly designed with use of a LOAD RACK for loading by drive from the before-mentioned MAIN CAMs with CAM GROOVE 2. The LOAD RACK is laid on the dead space in between the DD capstan motor and the head motor for effective space utilization. (Fig. 2-5)

The process from tape pull-out upon loading to contact of the leading guide section with the stopper of drum base and press-fitting under tension of spring is guided and driven in such a manner that the rod is drawn inward from the outer circumferential direction of the CAM GROOVE 2, thereby reducing the load torque (PV value) to the CAM GROOVE. And, the load of the loading motor is minimized to enhance reliability.

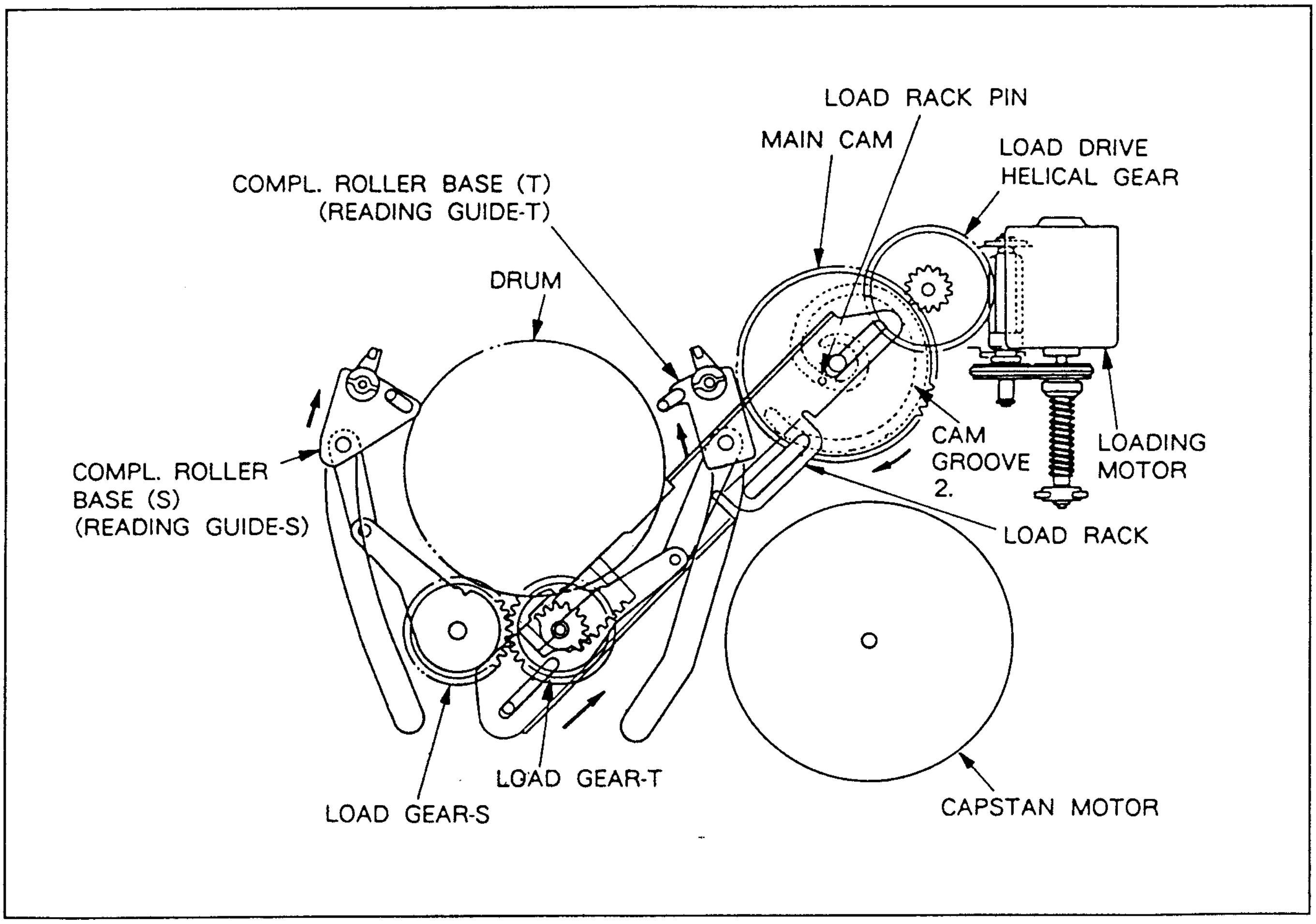

LOAD RACK PIN
MAIN CAM
LOAD DRIVE HELICAL GEAR
COMPL. ROLLER BASE (T) (READING GUIDE-T)
DRUM
COMPL. ROLLER BASE (S) (READING GUIDE-S)
CAM GROOVE 2.
LOADING MOTOR
LOAD RACK
LOAD GEAR-T
LOAD GEAR-S
CAPSTAN MOTOR

Fig. 2-5. Construction of Tape Loading Mechanism

2-2-2. Pinch Roller Pressing Mechanism

The PINCH LEVER assembly of the pinch roller is operated by the PINCH CAM LEVER (rod) driven by the CAM GROOVE 1 of the before-mentioned MAIN CAM, and then press-fitted to the capstan. The revolving tape guide (REV.GUIDE) is interlockingly operated with the PINCH LEVER assembly to ensure stable tape running at a fixed speed. (Fig. 2-6)

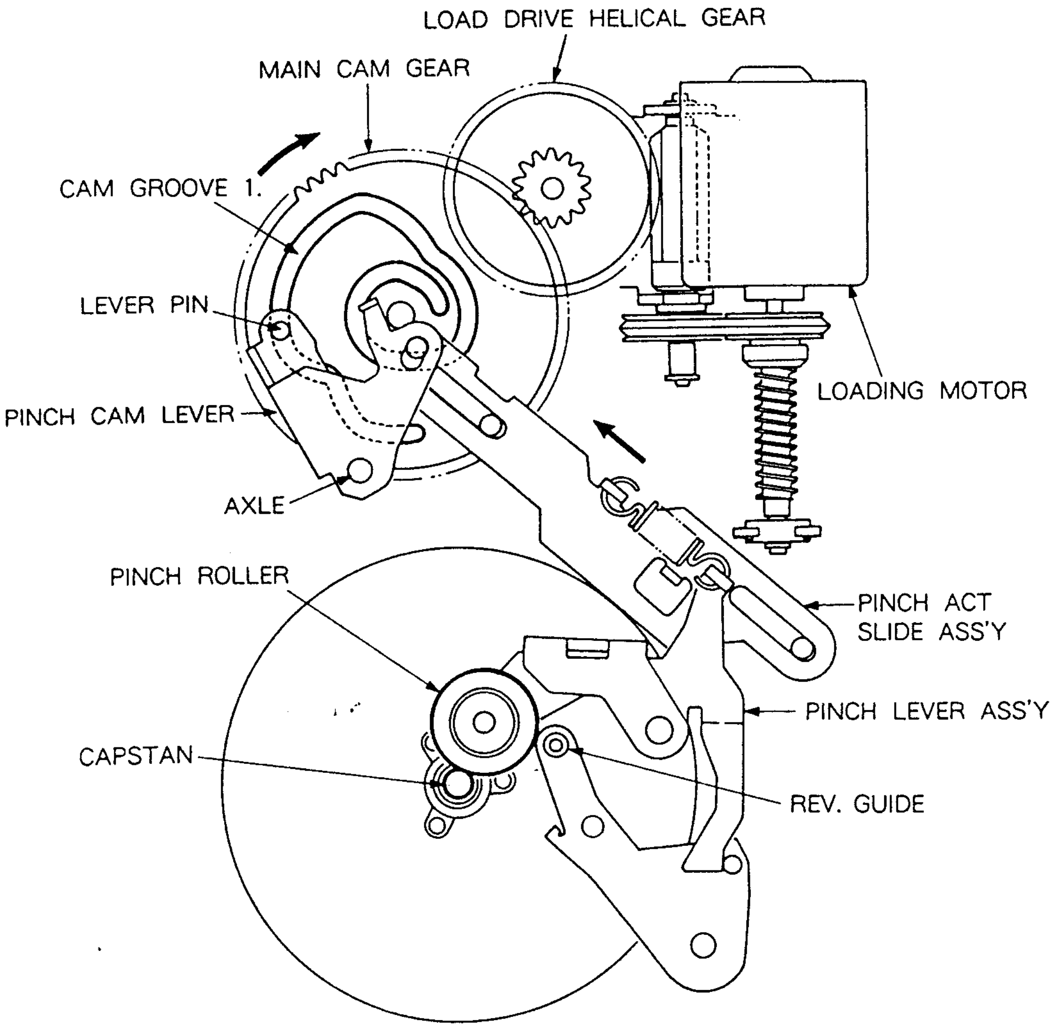

LOAD DRIVE HELICAL GEAR
MAIN CAM GEAR
CAM GROOVE 1.
LEVER PIN
PINCH CAM LEVER
AXLE
LOADING MOTOR
PINCH ROLLER
PINCH ACT SLIDE ASS'Y
PINCH LEVER ASS'Y
CAPSTAN
REV. GUIDE

Fig. 2-6 CONSTRUCTION OF PINCH ROLLER MECHANISM

2-2-3. Operation of Brake Control Plate

The ACT SLIDE PLATE and the MAIN SLIDE PLATE shown in Fig. 2-7 is driven by the CAM GROOVE 4 of the MODE CAM GEAR for precise control of operations including the control of back tension lever, auxiliary brake (SUB BRAKE S/T), main brake (SUPPLY BRAKE and TAKE-UP BRAKE), clutch selection, and drive selection of front loading mechanism.

Also, the mechanism mode switch is engaged with the small gear of the MODE CAM GEAR for sync rotation. At the time, the detection position of each mode is set so that it becomes the flat section at the cam curve of the CAM GROOVE 4 of the MODE CAM GEAR. So, even if motor stop time deviation occurs due to the load following the detection of the loading motor stop position, the control plate linked with a stop in the specified position.

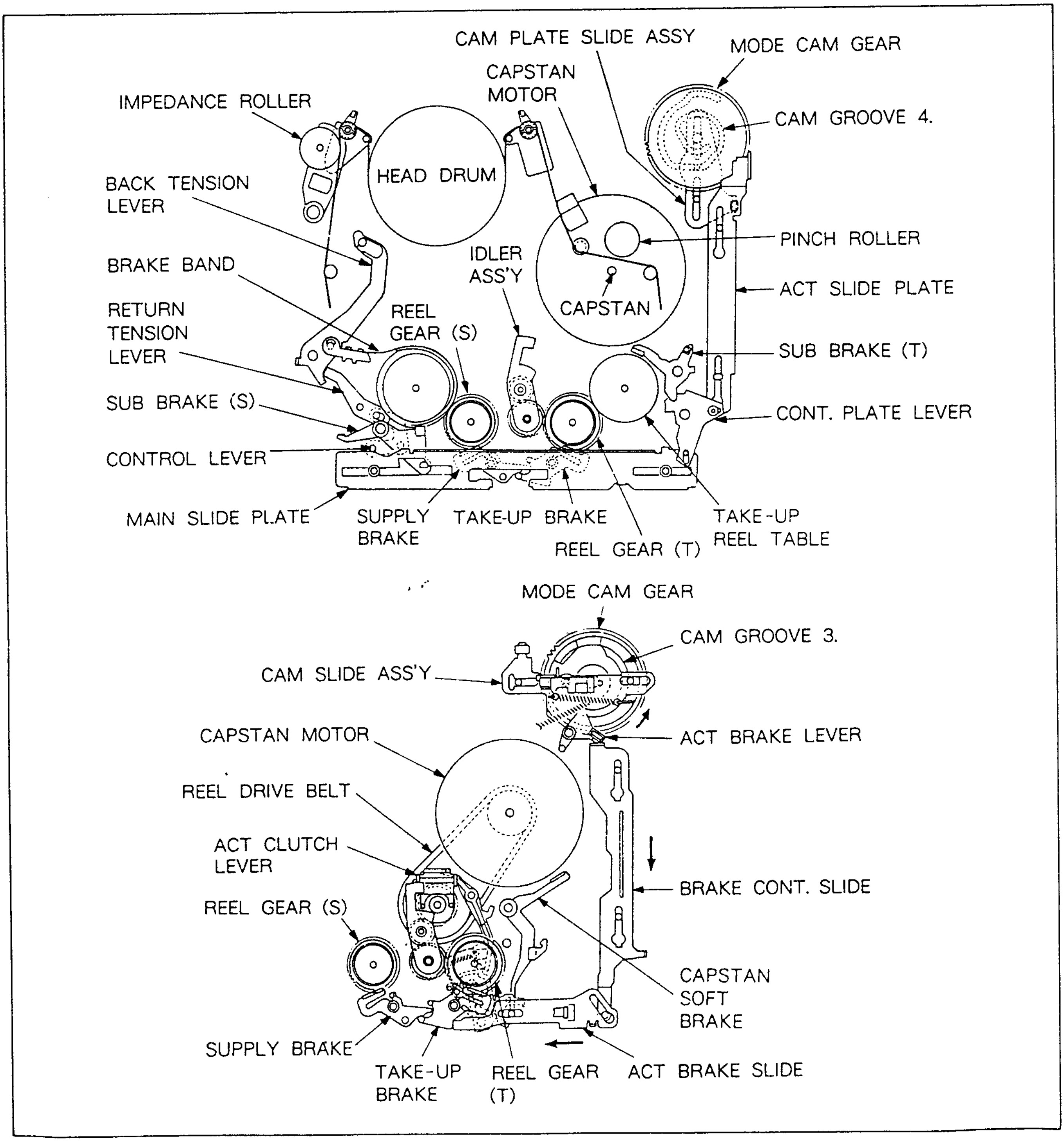

CAM PLATE SLIDE ASSY
MODE CAM GEAR
CAPSTAN MOTOR
IMPEDANCE ROLLER
CAM GROOVE 4.
HEAD DRUM
BACK TENSION LEVER
PINCH ROLLER
BRAKE BAND
IDLER ASS'Y
ACT SLIDE PLATE
RETURN TENSION LEVER
REEL GEAR (S)
CAPSTAN
SUB BRAKE (T)
SUB BRAKE (S)
CONT. PLATE LEVER
CONTROL LEVER
MAIN SLIDE PLATE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
TAKE-UP REEL TABLE
MODE CAM GEAR
CAM GROOVE 3.
CAM SLIDE ASS'Y
CAPSTAN MOTOR
ACT BRAKE LEVER
REEL DRIVE BELT
ACT CLUTCH LEVER
BRAKE CONT. SLIDE
REEL GEAR (S)
CAPSTAN SOFT BRAKE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
ACT BRAKE SLIDE

Fig. 2-7 CONSTRUCTION OF BRAKE CONTROL PLATE (AT REW/FF, STOP MODE)

2-2-4. Brake Control Mechanism

The mechanical logic of the brake state is shown in Fig. 2-8. The brake which damps the reel rotation is operated by the BRAKE CONTROL SLIDE driven from the CAM GROOVE 3 of the MODE CAM GEAR.

Also, to alleviate damage to the tape caused by high tension of the brake in operation, the tape is stopped after brake operation and the shape is thoughtfully designed for proper biting-in ratio of the left and the right brakes after-mentioned to each other.

This enables the supply brake to be released by the operation of the above-mentioned MAIN SLIDE PLATE after an elapse of prefixed slight time to reduce the tape tension to zero, and to provide the tape with a proper degree of looseness. As a result, a slight gap is created in the tape from the HEAD DRUM.

Further, a momentary still mechanism which dispenses with use of a plunger solenoid is not provided as one of design features of the P-90 mechanism.

To stabilize the image in an extremely short period of time during a shift to the STILL mode from the PLAY mode, the auxiliary brake (CAPSTAN SOFT BRAKE) is press-fit to the outer circumference of the capstan motor by the before-mentioned CAM GROOVE 3 of the MODE CAM GEAR.

These operations is interlocked with the operation of the before-mentioned ACT SLIDE PLATE and the MAIN SLIDE PLATE. It consists of one MODE CAM for offsetting the operating position.

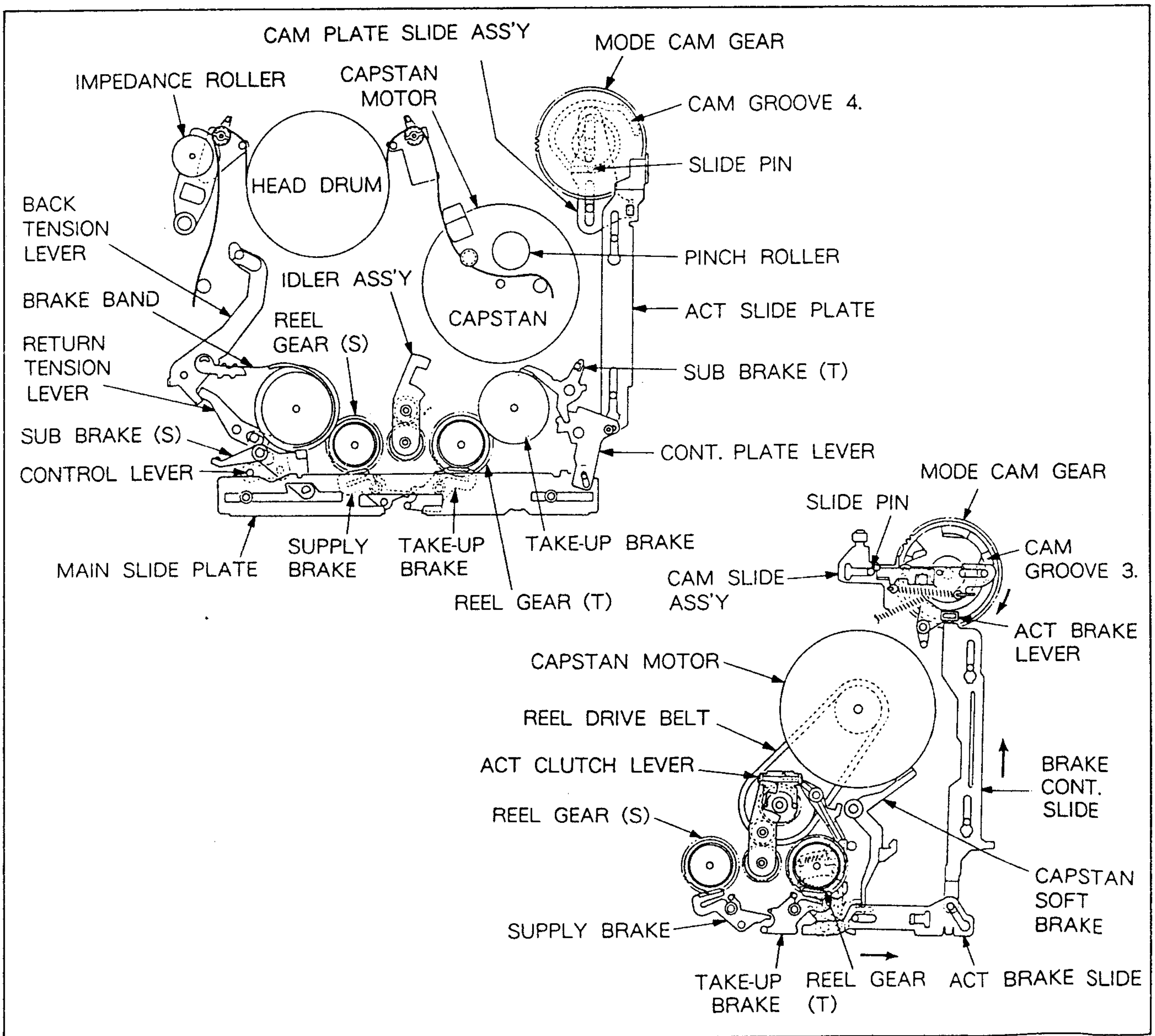

CAM PLATE SLIDE ASS'Y
MODE CAM GEAR
IMPEDANCE ROLLER
CAPSTAN MOTOR
CAM GROOVE 4.
SLIDE PIN
HEAD DRUM
BACK TENSION LEVER
PINCH ROLLER
IDLER ASS'Y
BRAKE BAND
CAPSTAN
ACT SLIDE PLATE
REEL GEAR (S)
RETURN TENSION LEVER
SUB BRAKE (T)
SUB BRAKE (S)
CONT. PLATE LEVER
CONTROL LEVER
MODE CAM GEAR
SLIDE PIN
SUPPLY BRAKE
TAKE-UP BRAKE
TAKE-UP BRAKE
MAIN SLIDE PLATE
CAM GROOVE 3.
CAM SLIDE ASS'Y
REEL GEAR (T)
ACT BRAKE LEVER
CAPSTAN MOTOR
REEL DRIVE BELT
ACT CLUTCH LEVER
BRAKE CONT. SLIDE
REEL GEAR (S)
CAPSTAN SOFT BRAKE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
ACT BRAKE SLIDE

Fig. 2-8 CONSTRUCTION OF BRAKE CONTROL PLATE (AT BRAKE MODE)

2-2-5. Brake Lock Release Mechanism (FF/REW→STOP Mode)

The brake lock momentary release mechanism is shown in Fig. 2-9 ⓐ, ⓑ and Fig. 2-10.

In the FF/REW mode (Fig. 2-9 ⓐ) mechanical elastic load is given to the BRAKE LOCK LEVER mounted on the BRAKE CAM SLIDE which causes the brake to operate, and it is locked to the high-speed rotary axle of the 1st reducing section of the loading motor.

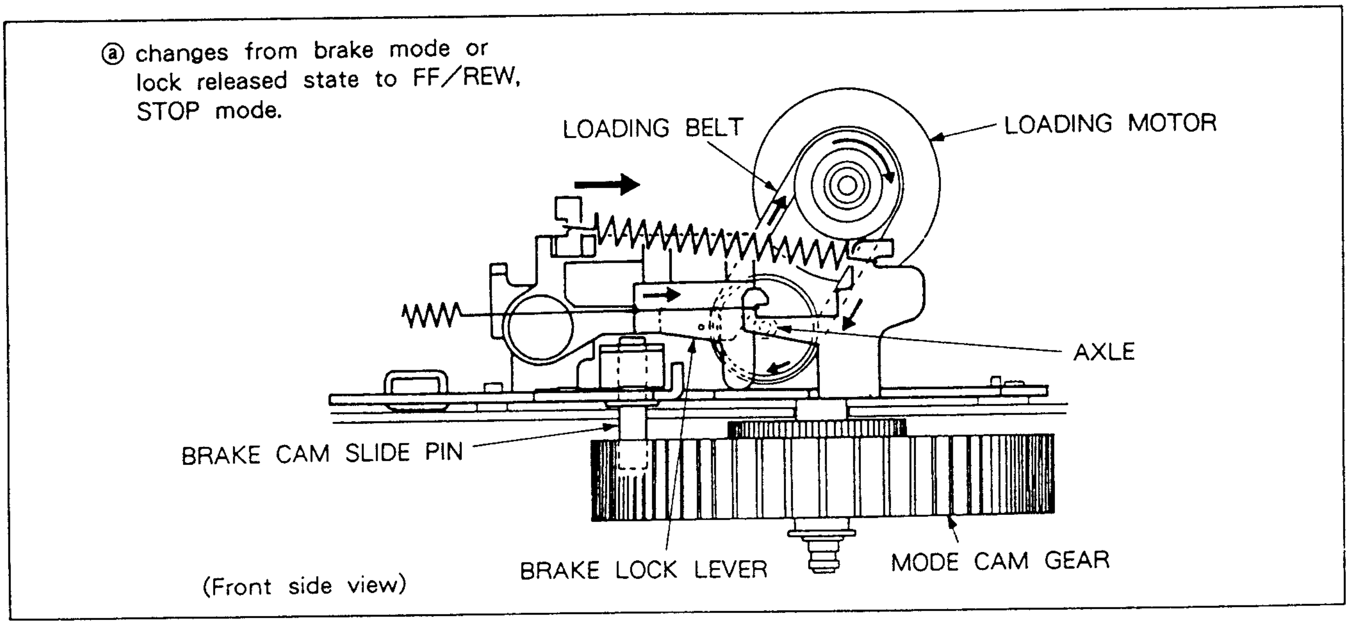

ⓐ changes from brake mode or lock released state to FF/REW, STOP mode.
LOADING BELT
LOADING MOTOR
AXLE
BRAKE CAM SLIDE PIN
BRAKE LOCK LEVER
MODE CAM GEAR
(Front side view)

Fig. 2-9 ⓐ BRAKE LOCK & RELEASE MECHANISM

At the time of a shift to the STOP mode from the FF/REW (Fig. 2-9 ⓑ), the BRAKE LOCK LEVER releases the lock on slight rotation of the axle by contact between the rotary shaft and the friction resistance so that the brake can be instantaneously applied to the reel. The lock release speed is almost the same as the start-up of the loading motor. So, the its response to the brake is very quick, and construction is simplified also.

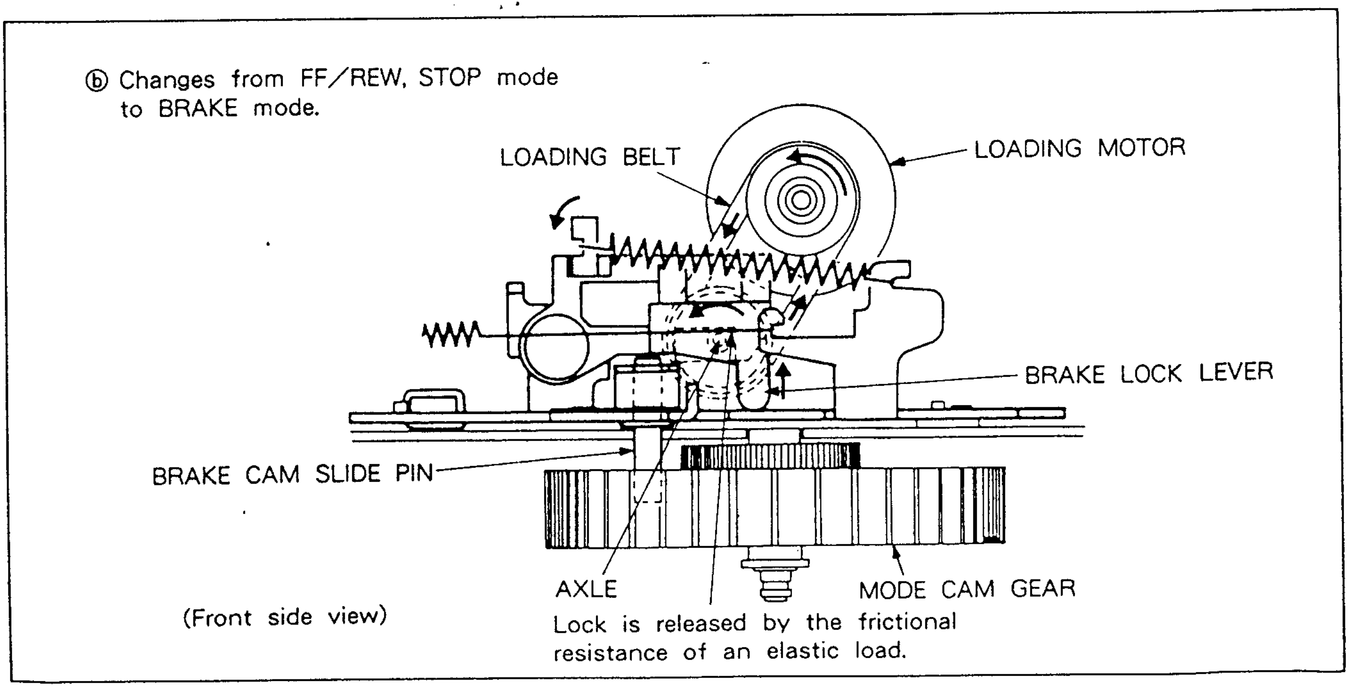

ⓑ Changes from FF/REW, STOP mode to BRAKE mode.
LOADING BELT
LOADING MOTOR
BRAKE LOCK LEVER
BRAKE CAM SLIDE PIN
AXLE
MODE CAM GEAR
(Front side view)
Lock is released by the frictional resistance of an elastic load.

Fig. 2-9 ⓑ BRAKE LOCK & RELEASE MECHANISM

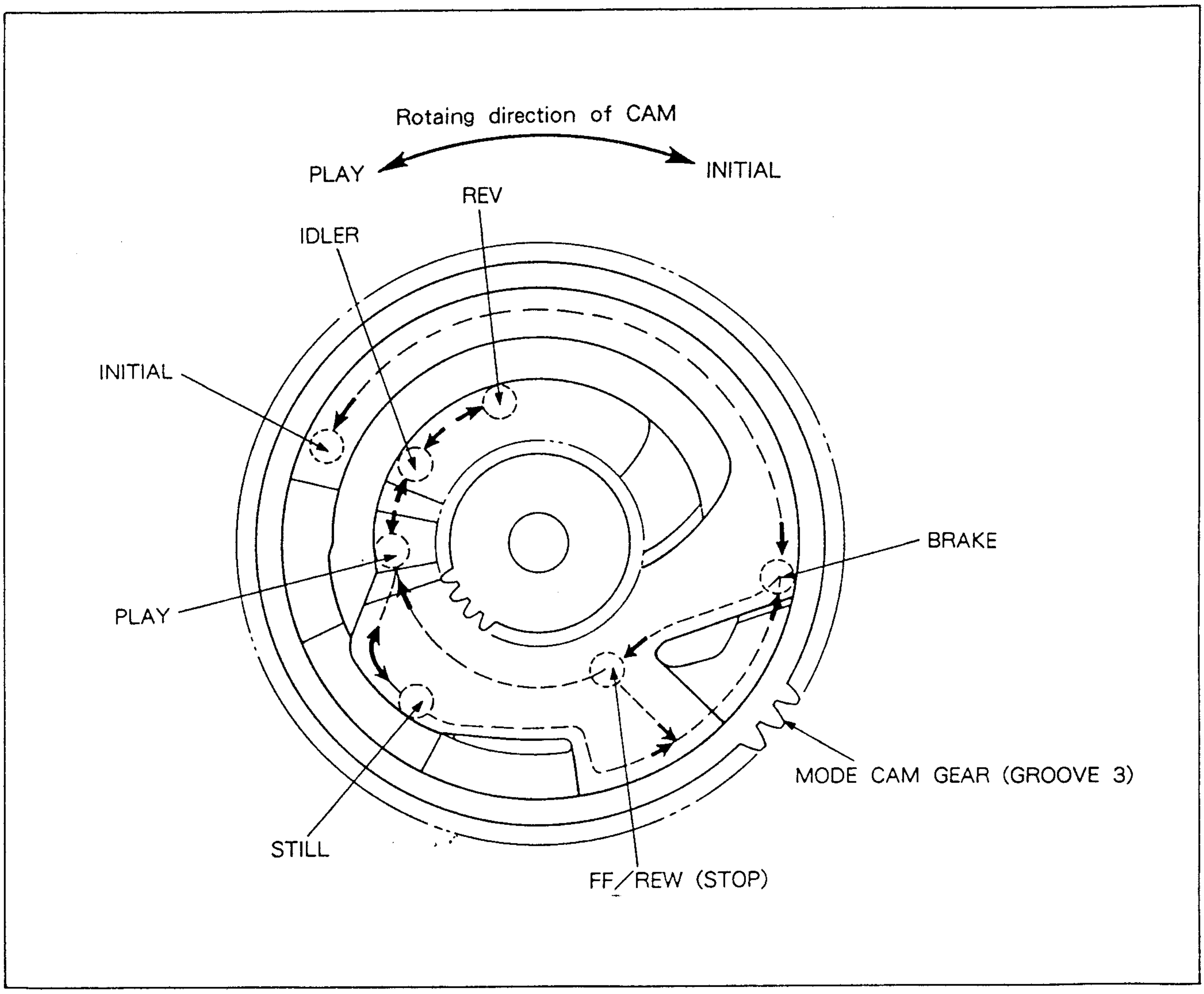

Rotaing direction of CAM
PLAY
INITIAL
REV
IDLER
INITIAL
BRAKE
PLAY
MODE CAM GEAR (GROOVE 3)
STILL
FF/REW (STOP)

Fig. 2-10 POSITIONING OF BRAKE CAM SLIDE-PIN ON THE GROOVE 3 OF MODE CAM GEAR

2-3. REEL TABLE DRIVE

2-3-1. Reel Table Drive Mechanism

This mechanism employs the system of driving the tape from the DD capstan motor via rubber belt. In the tape constant speed running mode for PLAY, F-SEARCH, and R-SEARCH, the capstan and the pinch roller are press-fitted to allow the tape to run at a constant speed. By providing a FRICTION MECHANISM in between the capstan motor and the reel table, the tape is taken up. In the FF/REW tape high-speed take-up mode, the capstan and the pinch roller are separated from each other, and the capstan motor and the reel table are linked direct by the clutch mechanism to carry out tape take-up. Also, to realize a thin type reel table drive section, the mechanism is simplified and the rotary parts are thinned for realization of physically compact design, and a step is provided on the reel table mounting section of the chassis by high-precision drawing process. A simplified figure of the drive mechanism is shown in Fig. 2-11 and Fig. 2-12. Power transmission to the pulley of the clutch mechanism section is done from the DD capstan motor via rubber belt.

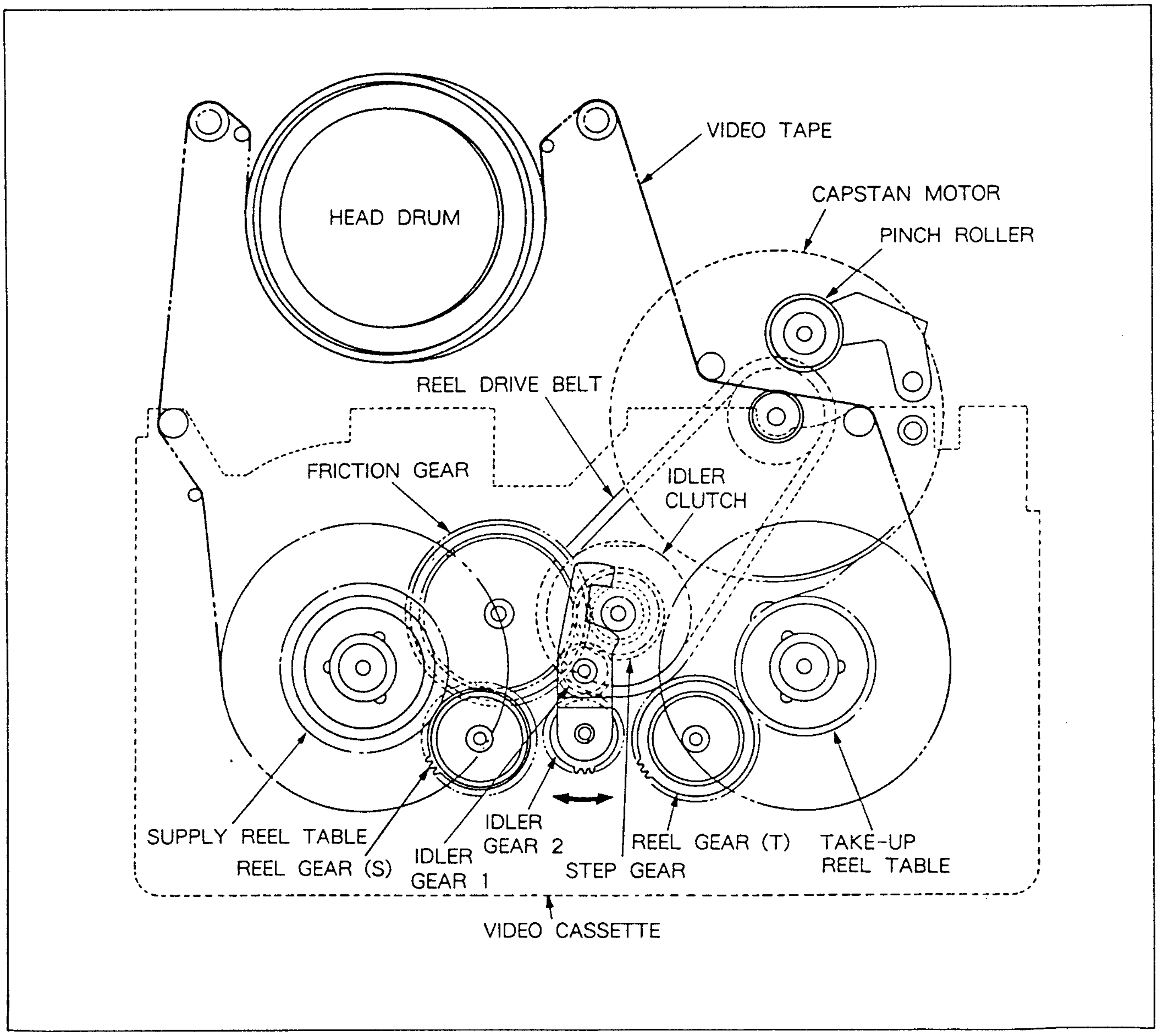
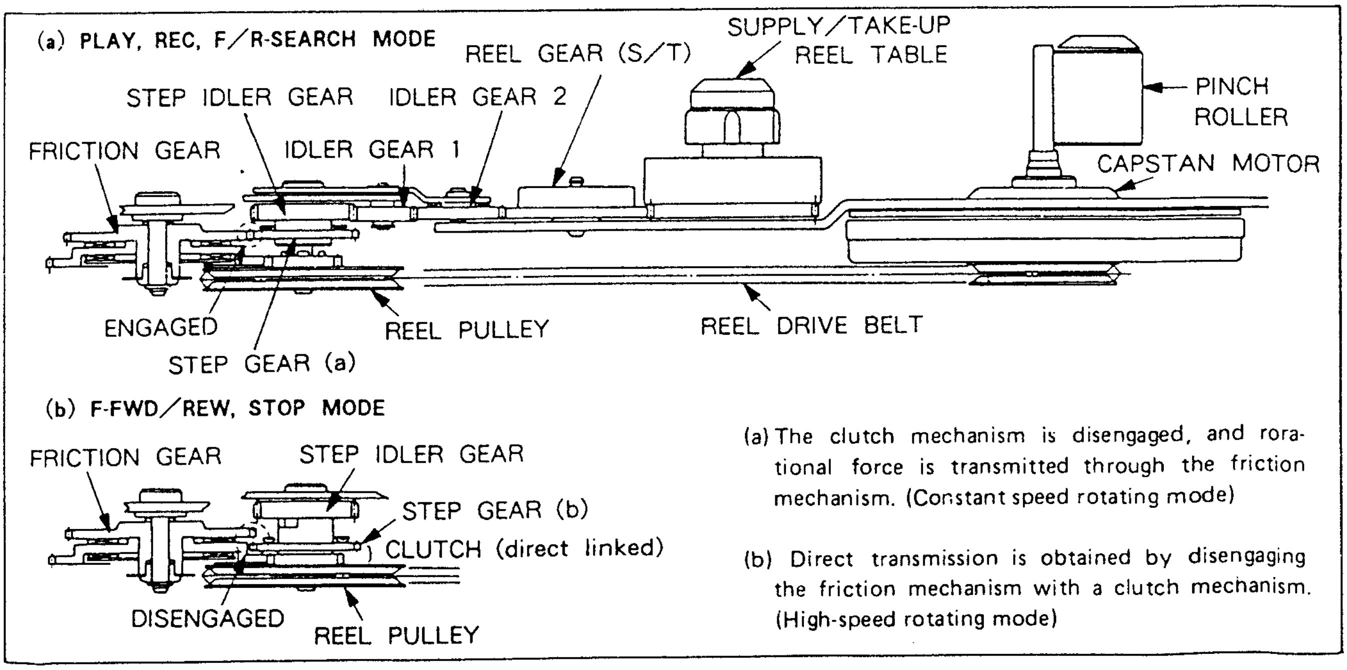

VIDEO TAPE
CAPSTAN MOTOR
PINCH ROLLER
HEAD DRUM
REEL DRIVE BELT
FRICTION GEAR
IDLER CLUTCH
SUPPLY REEL TABLE
REEL GEAR (S)
IDLER GEAR 1
IDLER GEAR 2
STEP GEAR
REEL GEAR (T)
TAKE-UP REEL TABLE
VIDEO CASSETTE

Fig. 2-11 REEL TABLE DRIVE

At that time, the reel table winding speed and the torque needed in a wide variety of modes are obtained by shifting the up and down STEP GEAR positioned at the upper section of pulley. The selection of the STEP GEAR is precision controlled by the MODE CAM GEAR via the BRAKE CONTROL SLIDE. With the up and down STEP GEAR down, the clutch mechanism is direct linked, and the transmission power from the capstan motor is sent to the reel table via IDLER GEAR assembly and REEL GEAR (S/T). On the other hand, FRICTION MECHANISM acts between the pulley and the STEP GEAR when the up and down STEP GEAR are in the elevated state, thereby controlling the transmission torque for generation of the take-up slip. Normally, it is desirable that the take-up torque of the reel table is higher in the R-SEARCH mode than that in the PLAY mode. This is because in the forward tape running the tape winding load to the HEAD DRUM has to be taken care of the capstan and the pinch roller.
While, in the reverse tape running mode the winding load has to be taken on the take-up reel table. In the special playback operation, a mechanism for varying the take-up torque of the reel table is required to be changed depending upon the running direction of the tape. But in this mechanism, the torque selection is made by varying the reduction speed ratio up to the reel table from the capstan motor on both the forward side and the reverse side of the tape. Also, design simplification of the selection mechanism is realized by using a single friction mechanism. In other words, the take-up torque necessary for forward/reverse rotation is obtained by controlling the capstan motor speed.

Rotation speed and torque needed for each mode of operation are converted by clutch mechanism for transmission of the drive power to the idler mechanism. The left and right moving IDLER GEAR assembly is automatically rotated to the left and the right according to the direction of capstan motor rotation by using the friction force. Because the mechanism is so designed as to drive the reel table of the side on which the tape is transported by the capstan and pinch roller, the forward and reverse constant speed drive (the PLAY, REC, F/R SEARCH modes) is carried out in the state in which the FRICTION MECHANISM is being operated (Fig. 2-12 ⓐ) On the other hand, in the condition in which the friction mechanism is not in operation, the forward/reverse high speed drive (FF/REW mode) is made possible (Fig. 2-12 ⓑ). Also, the reel drive in all modes is taken care of by the single left and right moving idler for design simplification.

The idler body employs gear drive to improve reliability with a view to realizing parts thinning while securing the transmission reliability. Using a resin molded gear as material of an idler, the efficiency of the entire reel drive system has been improved because there are no deformation and loss, and minimized rotation moving torque necessary for biting-in as in the case of a material such as rubber which shows considerable elastic deformation, etc. Further in this mechanism, an intermediate gear is provided in between the reel side and the idler to minimize the rotating and moving angle of the left and right moving idlers, thereby holding the reversing time to a minimum when shifting to the tape running direction change mode. This results in significantly reduced possibility of tape looseness.



(a) The clutch mechanism is disengaged, and rorational force is transmitted through the friction mechanism. (Constant speed rotating mode)

(b) Direct transmission is obtained by disengaging the friction mechanism with a clutch mechanism. (High-speed rotating mode)

Fig. 2-12 REEL TABLE DRIVE (SIDE VIEW)

2-3-2. Reel Table Drive Clutch Lock and Release Mechanism

As described in the preceding section, using the selection of the step gear (CLUTCH MECHANISM), two mechanisms which are driven by being selected via direct drive or via FRICTION MECHANISM from the capstan motor, to execute the reel table drive. The operating status of the clutch lock and the releasing mechanism is shown in Fig. 2-13.

Fig. 2-13 ① shows the tape unloading position (INITIAL position) when the power for the mechanism operating mode is switched off.

At that times all the levers are in the initial positions, and the clutch is released also so that a route for reel table drive is created via a friction mechanism.

Fig. 2-13 ② shows that the mechanism operation mode has executed the tape loading and that it has completed its movement to the STOP (stand-by), FF/REW position.

At this time, the CLUTCH ACT LEVER is operated by the hook of the ACT BRAKE SLIDE to move the ACT CLUTCH LEVER in the direction of arrow via the CLUTCH LEVER and the CLUTCH CHANGE LEVER. Now, the up and down STEP GEAR is placed into the direct coupled state. In the FF/REW mode, the reel table is directly driven so that the rotation of the capstan motor is directly transmitted to make high-speed rotation drive possible. When shifting the mode to the STOP from the FF/REW in this condition, the mechanism mode position is once moved back to the brake position, and when the reel table brake is instantaneously applied, the clutch is released once at the same time, after which it returns to the same mechanism mode as the FF/REW mode once again. Now, it is placed in a waiting state in the same condition of the STOP mode as shown in Fig. 2-13 ②.

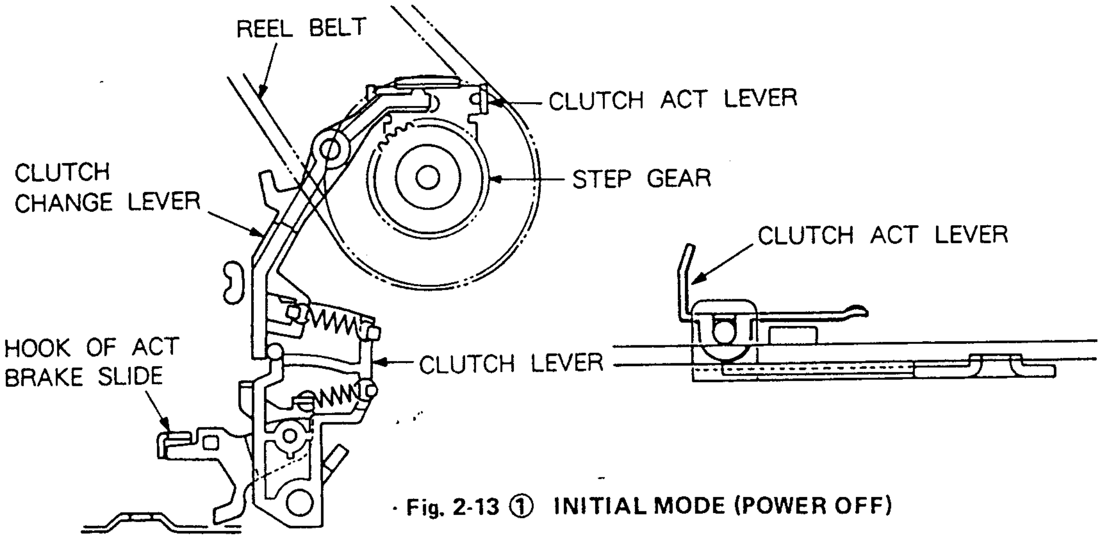

REEL BELT
CLUTCH ACT LEVER
STEP GEAR
CLUTCH CHANGE LEVER
CLUTCH ACT LEVER
HOOK OF ACT BRAKE SLIDE
CLUTCH LEVER

Fig. 2-13 ① INITIAL MODE (POWER OFF)

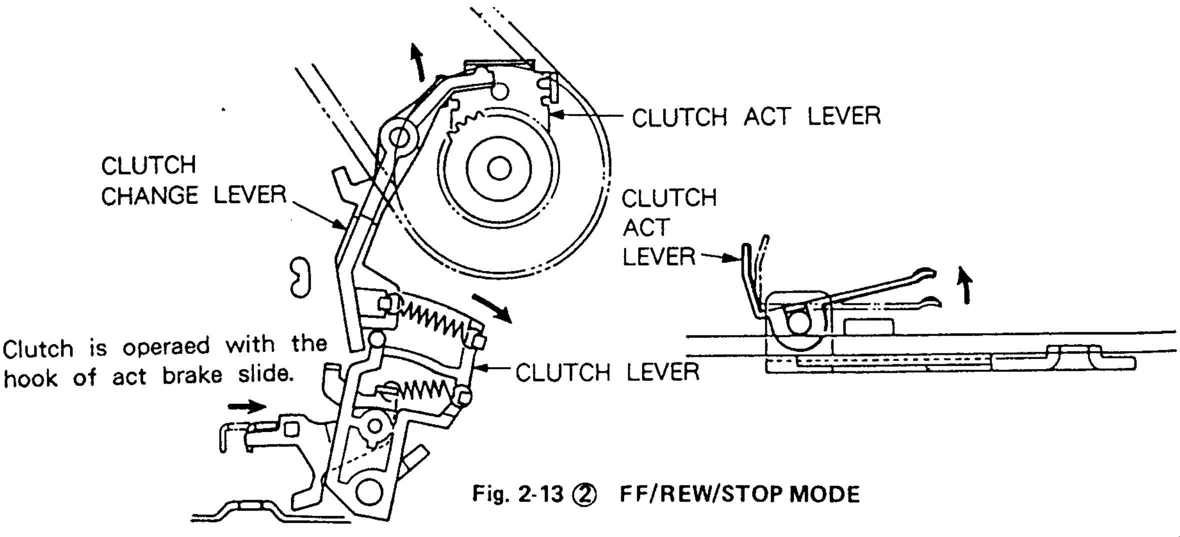
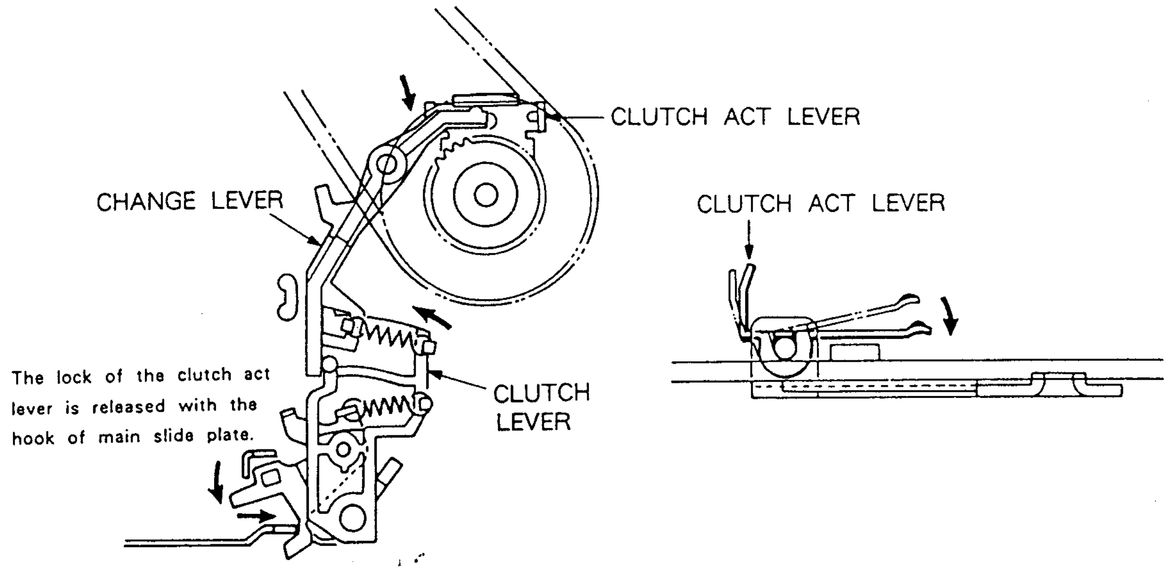

CLUTCH ACT LEVER
CLUTCH CHANGE LEVER
CLUTCH ACT LEVER
Clutch is operaed with the hook of act brake slide.
CLUTCH LEVER

Fig. 2-13 ② FF/REW/STOP MODE

Fig. 2-13 ① – ③ REEL TABLE DRIVE CLUTCH LOCK AND RELEASE MECHANISM

Fig. 2-13 ③ shows the completion state of a shift to the PLAY mode via the STILL mode from the STOP (FF/REW) mode for the mechanism mode position.
In the case of this mode shifting, the movement of the BRAKE ACT SLIDE remains fixed. So, the CLUTCH ACT LEVER should be unlocked by the movement of the hook of the MAIN SLIDE PLATE to cause the clutch to be released. This movement in turn causes the capstan motor rotation to be transmitted via the friction mechanism. So, the constant speed rotation drive necessary for the PLAY (REC) mode and SEARCH mode is made possible.



The lock of the clutch act lever is released with the hook of main slide plate.

Fig. 2-13 ③ FF/REW/STOP MODE → STILL MODE → PLAY MODE

2-4. FRONT LOADING DRIVE SELECTION MECHANISM

In the P-90 mechanism, the motor dedicated to the use of front loading is not employed. The drive source is utilized instead of the tape loading motor. As shown in Fig. 2-14 ⓐ/ⓑ, during the front loading the FRONT LOAD WORM GEAR directly coupled to the tape loading motor axle and the FRONT HELICAL GEAR with several teeth missing are engaged with each other and rotated for transmission of the drive force to the front loading mechanism. When the cassette tape is inserted completely in the mechanism, the FRONT HELICAL GEAR is automatically disengaged from the FRONT LOAD WORM GEAR. After that, the tape loading operation is performed without the tape loading motor drive force being transmitted to the front loading mechanism.

While the drive force is being transmitted to the front loading mechanism, the CAM GROOVEs of the before-mentioned MAIN CAM GEAR and the MODE CAM GEAR are flat in cam line pattern. These are therefore held without changing the mode state of the mechanism in any way.

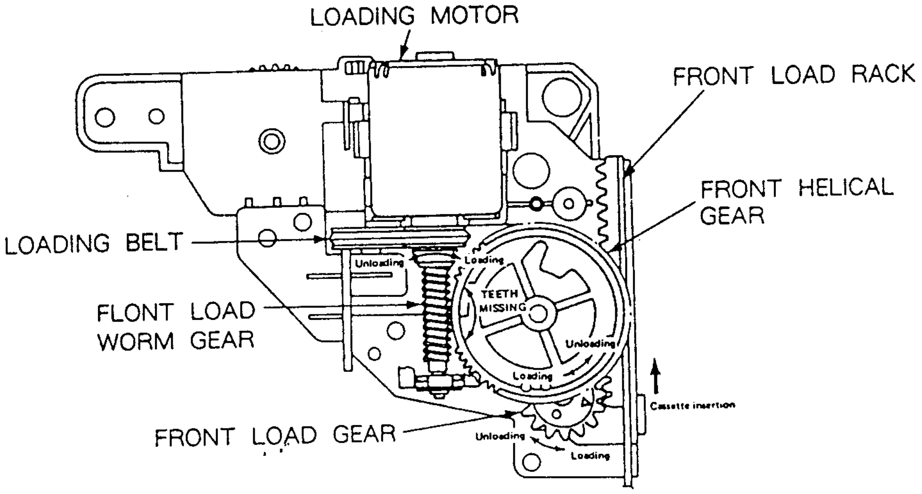

LOADING MOTOR
FRONT LOAD RACK
FRONT HELICAL GEAR
LOADING BELT
FLONT LOAD WORM GEAR
FRONT LOAD GEAR
Unloading
Loading
TEETH MISSING
Unloading
Loading
Cassette insertion
Unloading
Loading

Fig. 2-14 ⓐ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE INSERTED POSITION)

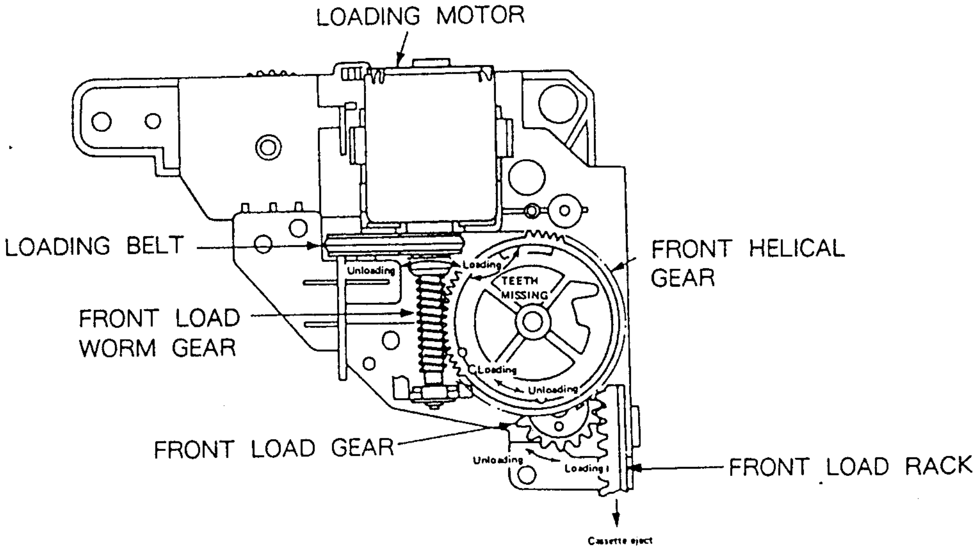

LOADING MOTOR
LOADING BELT
FRONT HELICAL GEAR
FRONT LOAD WORM GEAR
FRONT LOAD GEAR
FRONT LOAD RACK
Unloading
Loading
TEETH MISSING
Loading
Unloading
Unloading
Loading
Cassette eject

Fig. 2-14 ⓑ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE EJECTED POSITION)

(A) Cassette inserting operation

When inserting a cassette from the cassette ejected state of Fig. 2-14 ⓑ, the FL START SWITCH shown in Fig. 2-15 is turned OFF, to cause the loading motor to be rotated in the direction of insetting. As a result, the FRONT LOAD RACK is drawn in, and the front loading is made up to the cassette tape completion point. So, it is locked in the grooves shown in Fig. 2-15 to complete cassette inserting. At that time, the FRONT HELICAL GEAR is positioned at ⓐ of Fig. 2-14, and is released from the front loading mechanism, therefore, the tape loading operation is continuously performed.

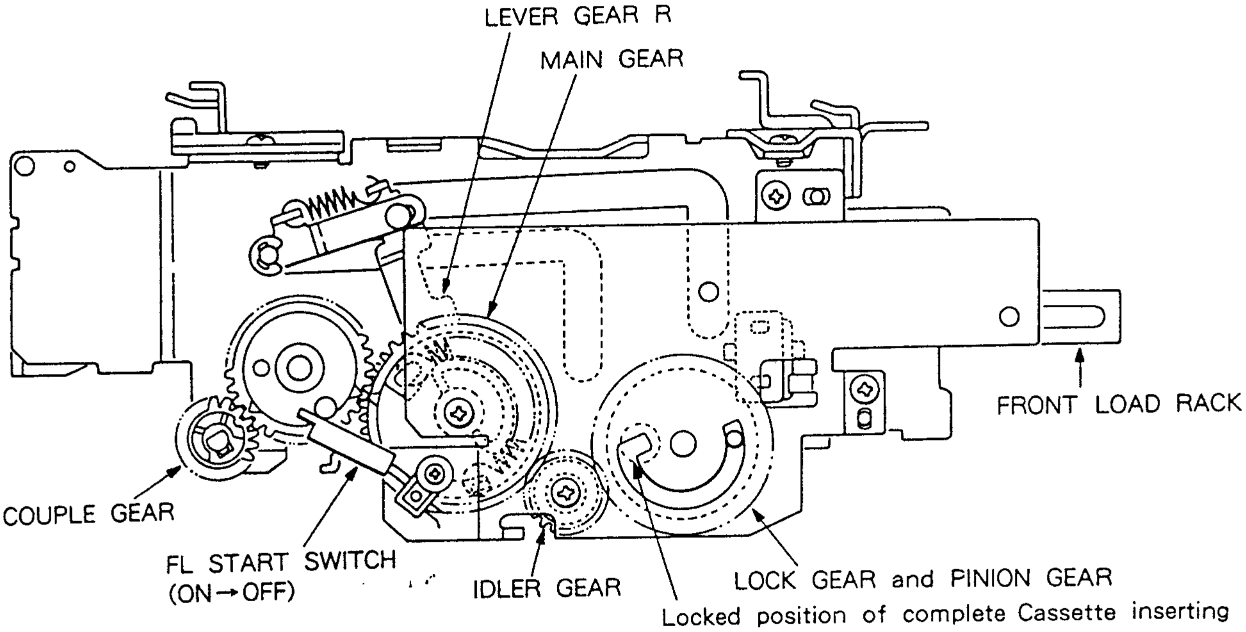

LEVER GEAR R
MAIN GEAR
FRONT LOAD RACK
COUPLE GEAR
FL START SWITCH
(ON→OFF)
IDLER GEAR
LOCK GEAR and PINION GEAR
Locked position of complete Cassette inserting

Fig. 2-15 CASSETTE HOLDER MECHANISM (CASSETTE INSERTING OPERATION)

(B) Cassette ejection operation

The components of the front loading mechanism is shown in Fig. 2-16.

When ejecting the cassette from the inserted state shown in Fig. 2-14 ⓐ, the FRONT ACT LEVER is pushed in the direction of arrow due to the ACT SLIDE PLATE moves in the direction of arrow shown in Fig. 2-17. As a result, the FRONT LEVER assembly is turned counterclockwise via the FRONT LOAD SLIDE to cause the FRONT HELICAL GEAR to be engaged with the FRONT LOAD WORM GEAR of the loading motor. At that time, the loading motor is being rotated counterclockwise, so that the FRONT HELICAL GEAR is caused to be rotated counterclockwise also to carry out the front unloading via the FRONT LOAD GEAR and the FRONT LOAD RACK. At the same time, the FRONT ACT LEVER is operated counterclockwise by the hook of the FRONT HELICAL GEAR. This releases the lock being pushed in the direction of arrow indicated by the ACT SLIDE PLATE. So, the FRONT LOAD SLIDE assembly now moves to the initial position to prepare for the next ejection operation. Incidentally, the movement of the FRONT LEVER assembly performs an important function of positioning the FRONT HELICAL GEAR (Fig. 2-14 ⓐ) upon completion of cassette mounting, in addition to the cassette eject start-up operation.

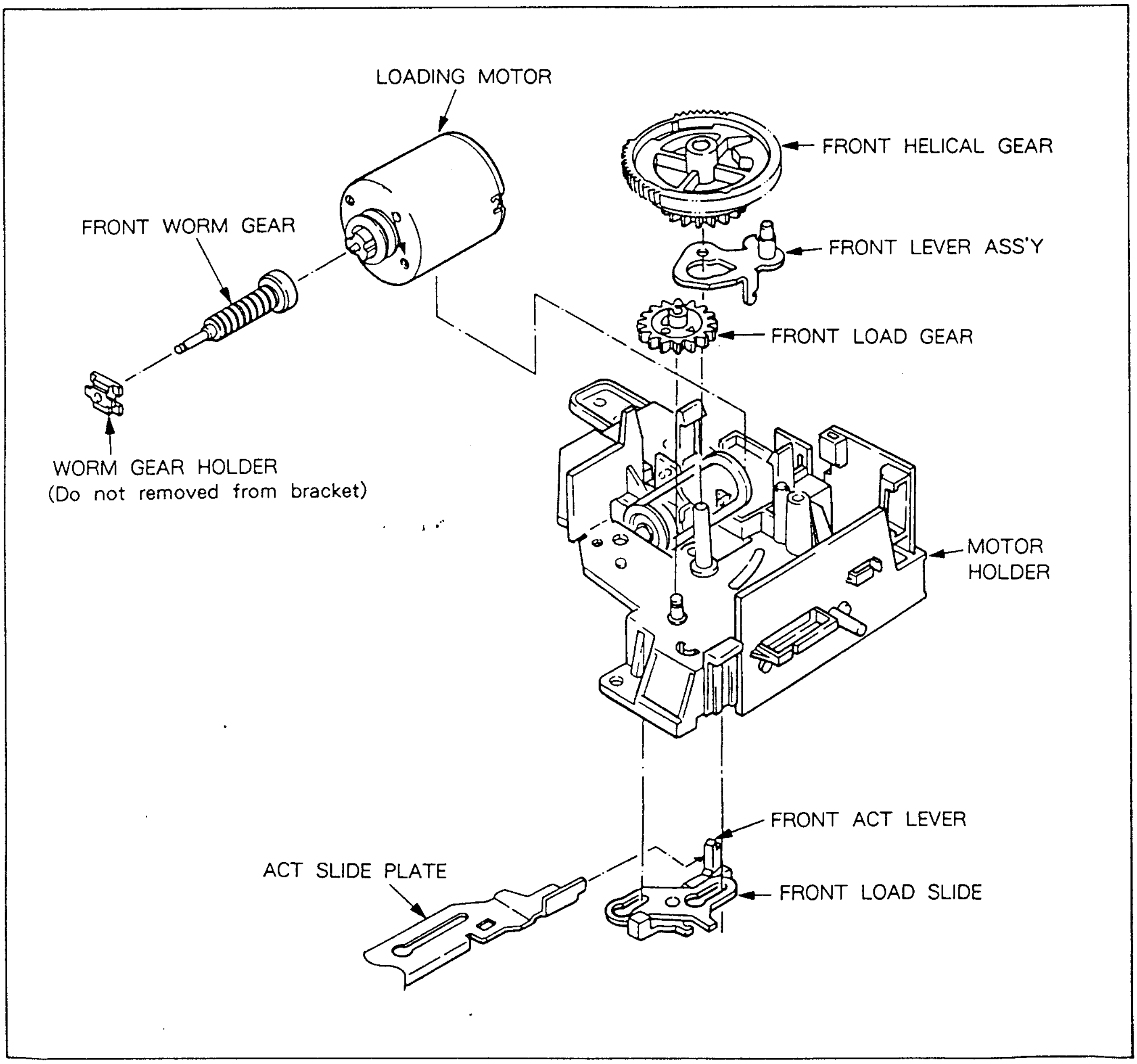
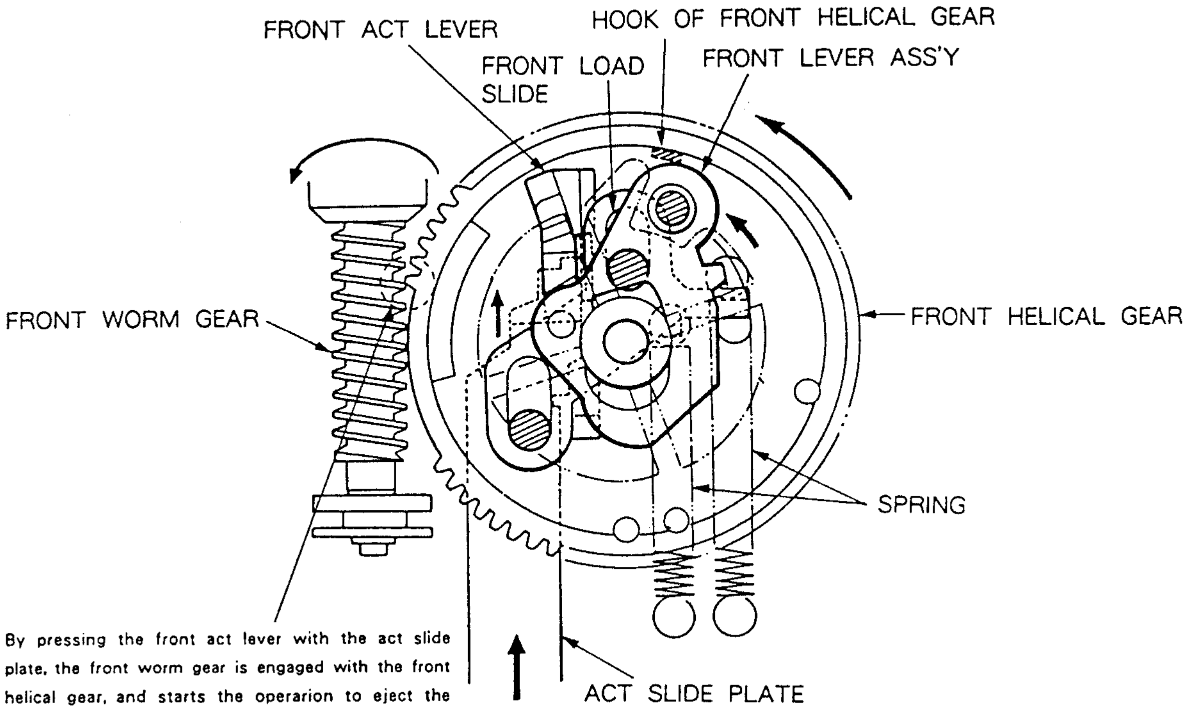

LOADING MOTOR
FRONT HELICAL GEAR
FRONT WORM GEAR
FRONT LEVER ASS'Y
FRONT LOAD GEAR
WORM GEAR HOLDER
(Do not removed from bracket)
MOTOR
HOLDER
FRONT ACT LEVER
ACT SLIDE PLATE
FRONT LOAD SLIDE

Fig. 2-16 FRONT LOADING DRIVE SELECTION MECHANISM


FRONT ACT LEVER
HOOK OF FRONT HELICAL GEAR
FRONT LOAD SLIDE
FRONT LEVER ASS'Y
FRONT WORM GEAR
FRONT HELICAL GEAR
SPRING
ACT SLIDE PLATE

By pressing the front act lever with the act slide plate, the front worm gear is engaged with the front helical gear, and starts the operarion to eject the cassette.

Fig. 2-17 **CASSETTE EJECTION START OPERATION** (See through top view)

2-5. CASSETTE HOLDER MECHANISM

2-5-1. Components

The exploded view of the cassette holder mechanism is shown in Fig. 2-18. This mechanism consists of a cassette tray for feeding the cassette tape to the specified position of the mechanism chassis, a side plate provided with L type holes for supporting and guiding it, the top plate for regulating the width of left and right, and a group of gears for driving the cassette tray.

The entire mechanism is of independent construction apart from the mechanism body. The holder is fixed on the mechanism chassis by inserting the pawls at two points and tightening the setscrews at two points, or at a total of four points.

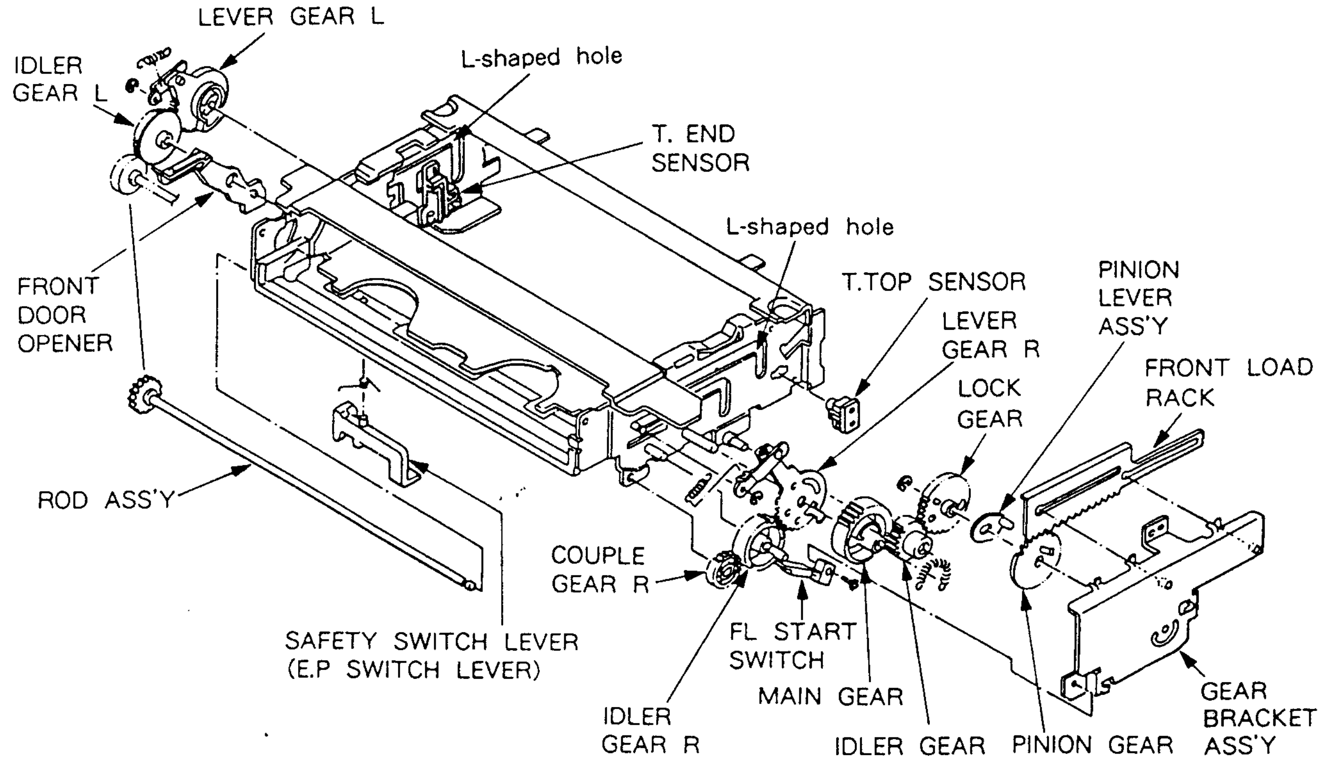

LEVER GEAR L
IDLER GEAR L
L-shaped hole
T. END SENSOR
L-shaped hole
FRONT DOOR OPENER
T.TOP SENSOR
LEVER GEAR R
PINION LEVER ASS'Y
FRONT LOAD RACK
LOCK GEAR
ROD ASS'Y
COUPLE GEAR R
SAFETY SWITCH LEVER (E.P SWITCH LEVER)
FL START SWITCH
MAIN GEAR
IDLER GEAR R
IDLER GEAR
PINION GEAR
GEAR BRACKET ASS'Y

Fig. 2-18 EXPLODED VIEW OF THE CASSETTE HOLDER MECHANISM

2-5-2. Description of Cassette Holder

The cassette holder is of motor-less design, as the lowering of mechanism height and driving source are done by the loading motor of the mechanism body.

As a substitute for the worm gear system hitherto used in the major drive section for the drive selection mechanism mentioned in section 2-4., the RACK LOADING system is adopted in this cassette holder mechanism. By this mechanism the motor-less design can be realized. An exploded view of the mechanism is shown in Fig. 2-19. A description of the operation is made below along with Fig. 2-19.

To press-fit the cassette tape after sending it onto the mechanism chassis, the PINION GEAR section is triple construction. The FRONT LOAD RACK side and the IDLER GEAR side are independently engaged. The PINION GEAR and the LOCK GEAR are connected from the PINION LEVER PIN riveted to the PINION LEVER. Even after feeding the cassette tape to the specified position of the mechanism chassis, the FRONT LOAD RACK slides, giving the rotation to the PINION GEAR which is engaged with the FRONT LOAD RACK. At that time, a pin is dropped into the groove section provided on the GEAR BRACKET ASS'Y.

The other LOCK GEAR is fixed by this PINION LEVER PIN, and the cassette tape is press-fitted onto the mechanism chassis by linked IDLER GEAR. The before-mentioned FRONT LOAD RACK and the PINION GEAR are set free after dropping the PINION LEVER PIN into the groove section. So, the drive force of the loading motor is sent to the mechanism body.

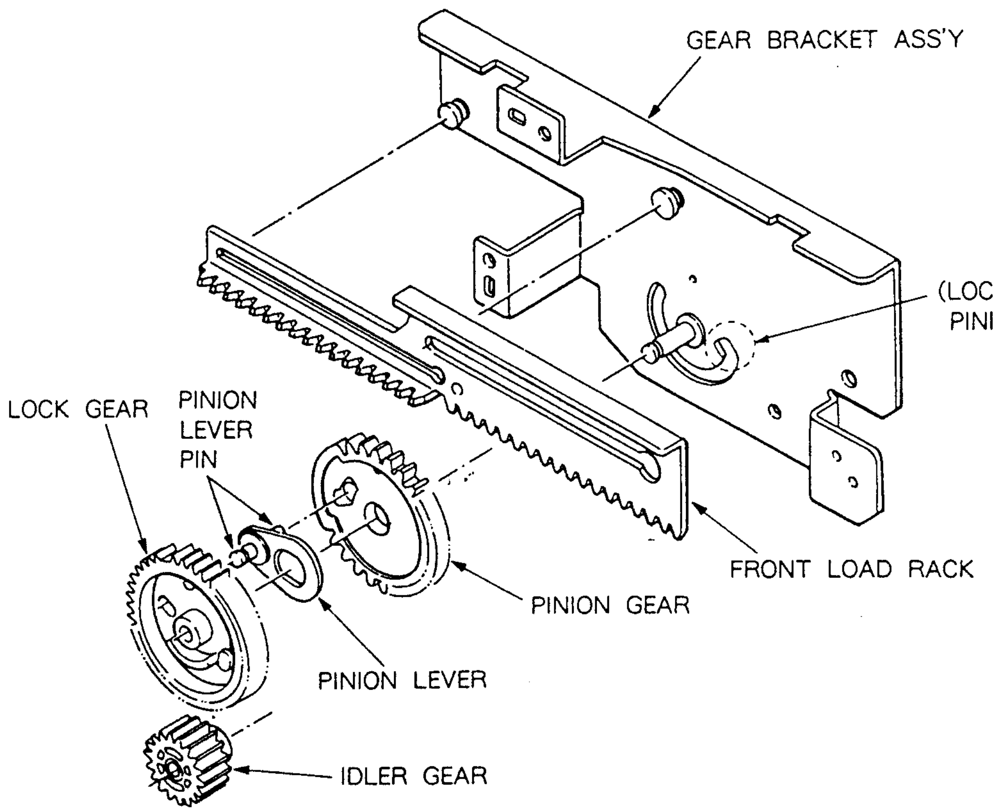


Fig. 2-19 RACK LOADING MECHANISM OF CASSETTE HOLDER

3. MECHANISM CONTROL

3-1. MODE ARRANGEMENT

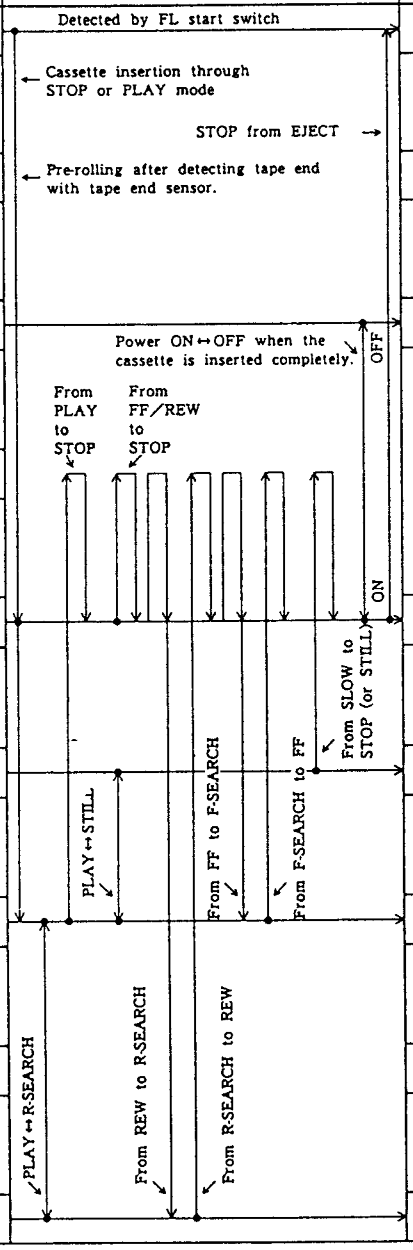
This mechanism is arranged in such a mode layout as shown in Table. 3-1 and as described in section 2-1. The mode sensing switch described below is used for control of these modes.

3-2. MODE DETECTION SWITCH

For mode detecting one leaf switch (FL START SWITCH and one rotary switch (MECHANISM MODE SWITCH) are used in combination.

Mechanism Mode	Mechanism Mode Switch 3	2	1	HEX DATA	Function	VTR Operation Mode
EJECT	–	–	–		Eject position	EJECT
					Front loading/Unloading	
SHORT REW	1	1	0		Take up operation in the tape end position	Low side of ⑥. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position	Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position	
BRAKE	0	0	1	①	Main brake applying position	
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)	STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.	STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode	PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position	PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode	R-SEARCH

Main Mode Shifting Conditions



Detected by FL start switch
Cassette insertion through STOP or PLAY mode
STOP from EJECT
Pre-rolling after detecting tape end with tape end sensor.
Power ON↔OFF when the cassette is inserted completely.
OFF
From PLAY to STOP
From FF/REW to STOP
ON
From SLOW to STOP (or STILL)
From F-SEARCH to FF
PLAY↔STILL
From FF to F-SEARCH
From F-SEARCH to FF
PLAY↔R-SEARCH
From REW to R-SEARCH
From R-SEARCH to REW

Table 3-1

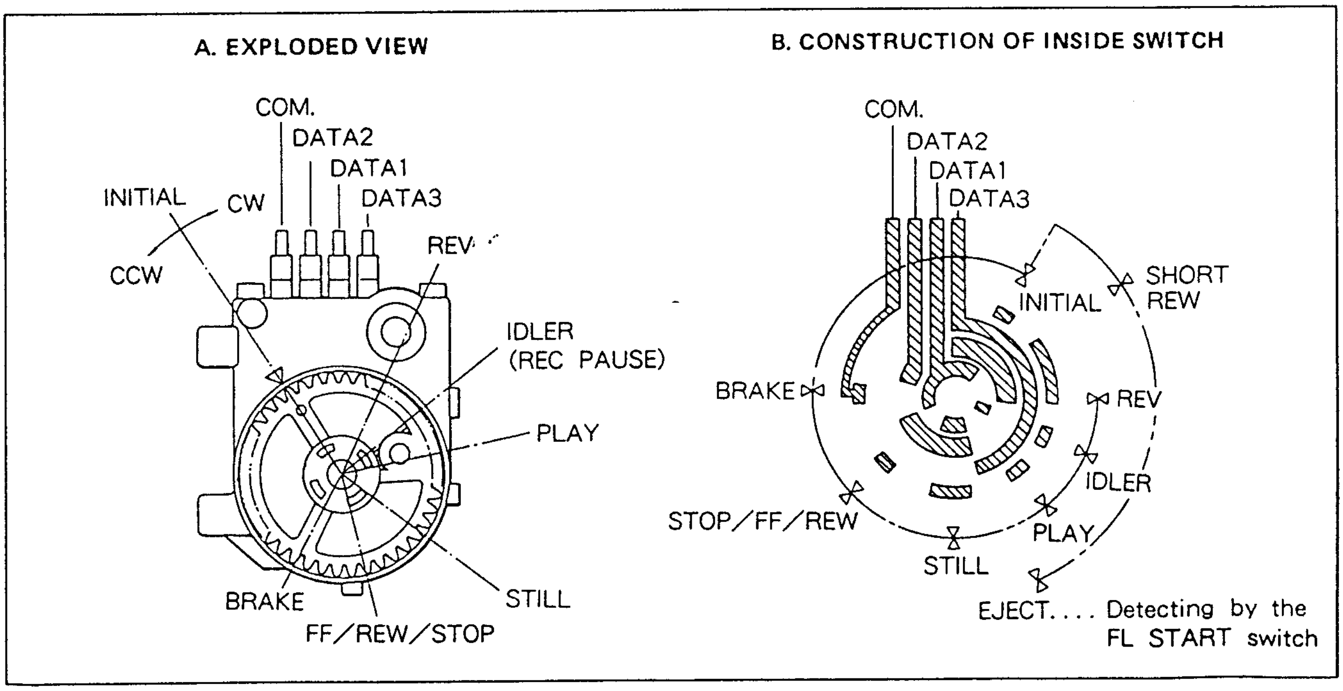
(1) Switch component
The mode switch consists of FL START SWITCH for detecting the cassette ejection and insertion, and MECHANISM MODE SWITCH for detecting the each mode position of the mechanism. As can be understood from Fig. 3-1, the MECHANISM MODE SWITCH rotates in excess of 360 degrees. Therefore, the sensing of a signal from the MECHANISM MODE SWITCH is done by the leaf switch.
In the P88 and P89 mechanisms, incidentally, short REW position is detected by the FL END SW, but in the P90 mechanism, the FL END SWITCH is not required due to a change in the internal structure of the MECHANISM MODE SWITCH.

(2) Mechanism mode switch
The mechanism mode switch consists of four terminals, namely, COM, DATA1, DATA2, and DATA3. These are processed as 3-bit signals for discrimination of seven modes.
The MECHANISM MODE SWITCH is not interchangeable with the hither to available black switch due to a change in its internal structure. Be sure therefore to use a blue switch.

3-3. CONSIDERATION TO FULL LOADING

① In the normal stop condition, the head drum is rotated to facilitate the start-up of the image at the time of playback, but it is conceivable that this is left undisturbed for an extended period of time. This may result in wear of the video head. For this reason, when five minutes elapse from the stop condition, the head drum stops rotating.

② To prevent the tape from being caught in the head drum due to dew forming, etc., the tape is housed in the unloaded cassette when turning the power off.


A. EXPLODED VIEW

B. CONSTRUCTION OF INSIDE SWITCH

COM.
DATA2
DATA1
DATA3
INITIAL
CW
CCW
REV
IDLER
(REC PAUSE)
PLAY
BRAKE
FF/REW/STOP
STILL
COM.
DATA2
DATA1
DATA3
INITIAL
SHORT
REW
BRAKE
REV
IDLER
STOP/FF/REW
PLAY
STILL
EJECT.... Detecting by the
FL START switch

Fig. 3-1 MECHANISM MODE SWITCH (ROTARY SWITCH)

4. MECHANISM MAINTENANCE AND CHECKING

4-1. PERIODIC CHECKING AND MAINTENANCE ITEMS AND SERVICE JIGS

The following maintenance and periodic checking procedures are recommended to ensure proper operation, and to protect the tape from dirt and damage. Also, these procedures should always be followed after repairing the unit.

4-1-1. Periodic Check Items

○ Cleaning ◎ Confirmation △ Lubrication

Part	Usage Time (hours)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape Guide System	Tape running surfaces	○	○	○	○	○	○	○	○	○	○	
	ACE head	○	○	○	○	○	○	○	○	○	○	
	Drum (cylinder)	○	○	○	○	○	○	○	○	○	○	Head life depends heavily on operating conditions.
Drive System	Loading belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Reel drive belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Intermediate gear, pulley axles		△		△		△		△		△	Absolutely avoid oil on tape running surfaces.
	Capstan axles		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Performance Check	Back tension torque		◎		◎		◎		◎		◎	50 ± 10gcm.
	Brake system		◎		◎		◎		◎		◎	
	FF, REV, PLAY torque		◎		◎		◎		◎		◎	FF : 600 gcm and over REW:750 gcm and over REV : 150 to 240 gcm PLAY: 80 to 140 gcm

Note: The back tension torque is the value that has been measured by the cassette torque meter (Back tension, REW: VHT-063S) (REV: VHT-404S).
The torque of FF, REV, REW, and PLAY represent those measured with them locked by the torque gauge.
FF and REW are values 2 seconds after starting.
Torque Tape: VHT-063S (J-6082-066-A)
VHT-404S (J-6082-067-A)

4-1-2. Cleaning

① Drum (COMPL CYLINDER) and Video Heads (See Fig. 4-1-1.)

1) Wrap a chamois leather around your finger and moisten it with methyl alcohol.
2) Move the chamois leather to left and right several times on the video head to clean. There is a video head also on the opposite side, so clean it likewise. In Hi-Fi models, clean the audio head also.
3) Clean the tape path surface of the cylinder in the same way.

Note : Always turn power off before cleaning. Do never move the chamois leather vertically or apply too much force to the head ; it may be damaged.

② Cleaning of the Tape Guide System (See Fig. 4-1-2.)

1) Set the EJECT mode and clean the tape guide system (tape guides, impedance roller, FTE head, ACE head, pinch rollers, capstan axles, etc.) with a chamois leather moistened with methyl alcohol.

Note : Make sure that no oil, grease, etc. adhere to the chamois leather and that heads are not damaged.

③ Cleaning of the Drive System

1) Clean the drive system (loading belt, reel drive belt, pulley, supply reel table, etc.) with a soft cloth moistened with methyl alcohol.

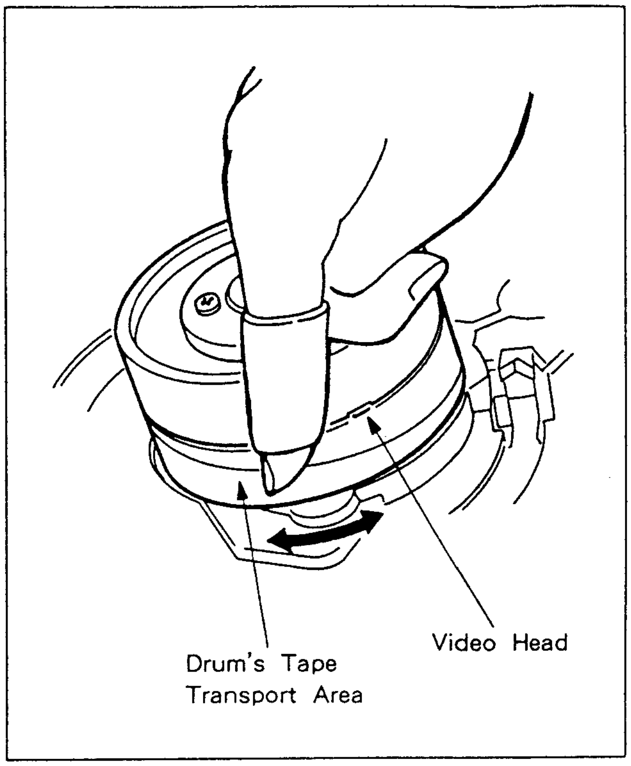

Video Head
Drum's Tape Transport Area

Fig. 4-1-1.

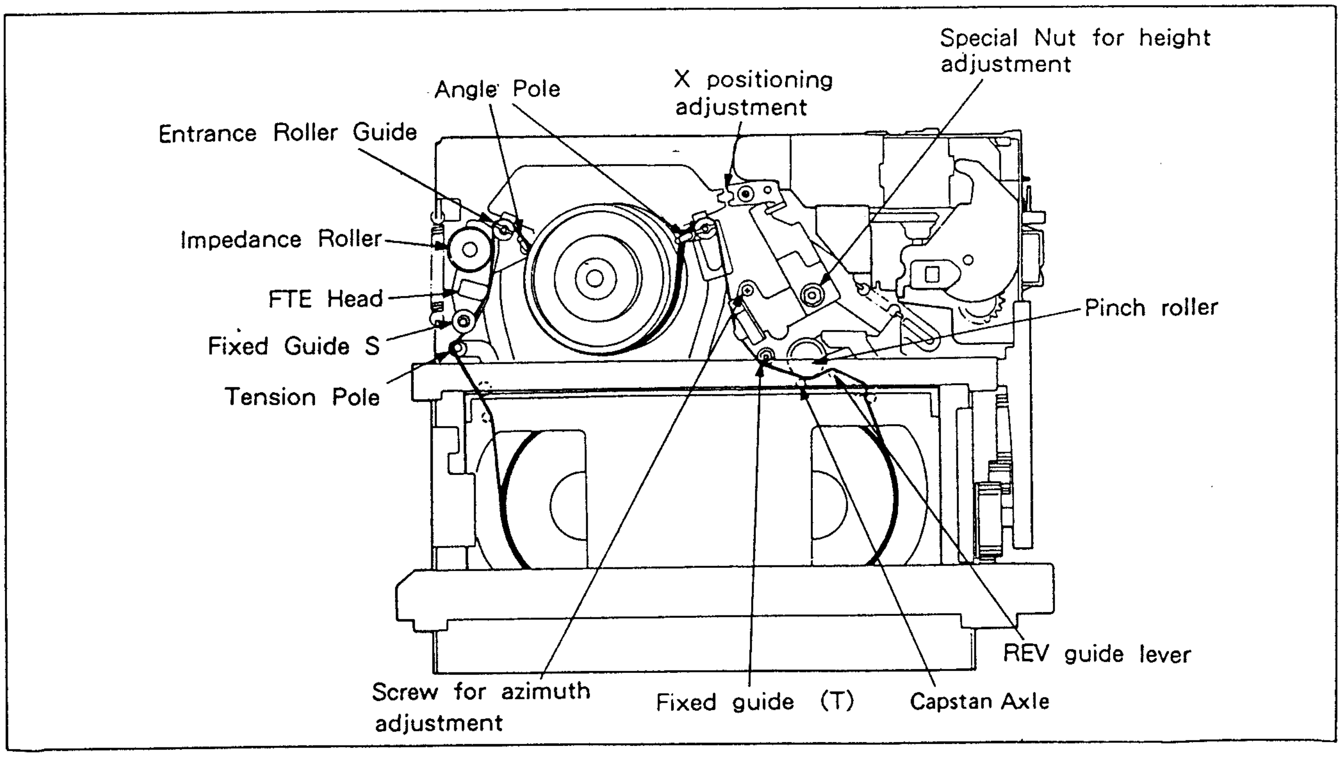
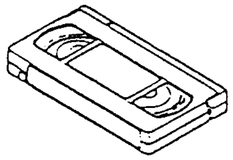

Special Nut for height adjustment
Angle Pole
X positioning adjustment
Entrance Roller Guide
Impedance Roller
FTE Head
Fixed Guide S
Tension Pole
Pinch roller
REV guide lever
Screw for azimuth adjustment
Fixed guide (T)
Capstan Axle

Fig. 4-1-2. Cleaning

4-1-3. Service Jigs

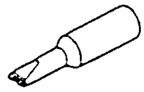
No.	Jig	Jig No.	Remarks
1	Alignment tape (PAL)	H-7099-052-H	PAL-NORMAL
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	For tape path adjustment
3	Nut box (VHJ-0048)	J-6082-045-A	For tape path adjustment
4	Torque gauge	H-7099-039-H	For reel take-up torque measurement
5	Torque gauge adapter	H-7099-035-H	For reel take-up torque measurement
6	Fixed guide height gauge (VHJ-0053)	J-6082-052-A	For fixed gaude (S) height adjustment
7	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	For screw fastening torque adjustment
8	3mm dia. bit for torque screwdriver (VHJ-0045)	J-6082-048-A	Spare bit for the torque gauge screwdriver
9	Video head removing tool (VHJ-0041)	J-6082-049-A	For upper drum removal
10	Mode selector (VHJ-0050)	J-6082-050-A	For mechanism mode selection
11	Master plane	H-7099-279-H	Reel table height
12	Reel disc height jig	H-7099-038-H	Reel table height
13	Mode selector relay board (VHJ-0075)	J-6090-008-A	Relay board for mode selector
14	PAL torque cassette (VHT-063S) (PAL)	J-6082-066-A	For back tension torque
15	26-pin flexible flat cable (VHJ-0064)	J-6090-006-A	Spare cable for mode selector
16	7-wire flat cable (VHJ-0076)	J-6090-009-A	Spare cable for relay board
17	REV guide lever removing tool (VHJ-0073)	J-6090-007-A	For REV guide lever removal
18	Mode selecter relay baord (VHJ-0089)	VHJ-	Relay board for mode selector [For compact size model (width : 360mm)]

H-7099-052-H



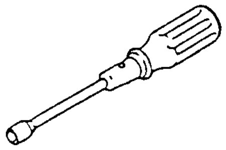
No. 1

J-6082-044-A (VHJ-0003)



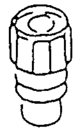
No. 2

J-6082-045-A (VHJ-0048)



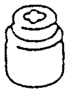
No. 3

H-7099-039-H



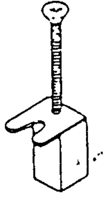
No. 4

H-7099-035-H



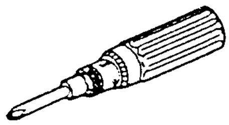
No. 5

J-6082-052-A (VHJ-0053)



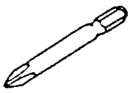
No. 6

J-6082-047-A (VHJ-0014)



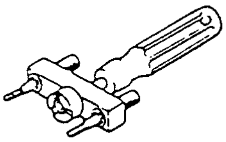
No. 7

J-6082-048-A (VHJ-0045)



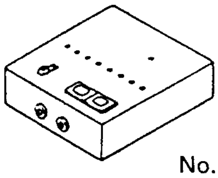
No. 8

J-6082-049-A (VHJ-0041)



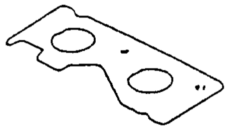
No. 9

J-6082-050-A (VHJ-0050)



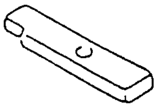
No. 10

H-7099-279-H



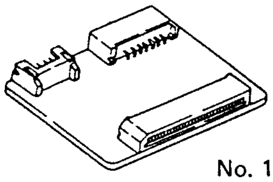
No. 11

H-7099-038-H



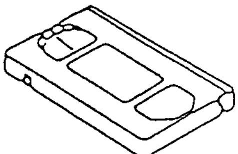
No. 12

J-6090-008-A (VHJ-0075)



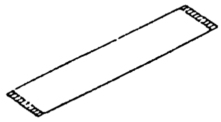
No. 13

J-6082-066-A



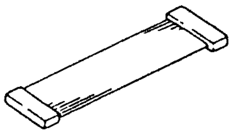
No. 14

J-6090-006-A (VHJ-0064)



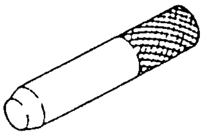
No. 15

J-6090-009-A (VHJ-0076)



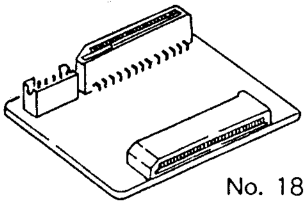
No. 16

J-6090-007-A (VHJ-0073)



No. 17

VHJ-0089

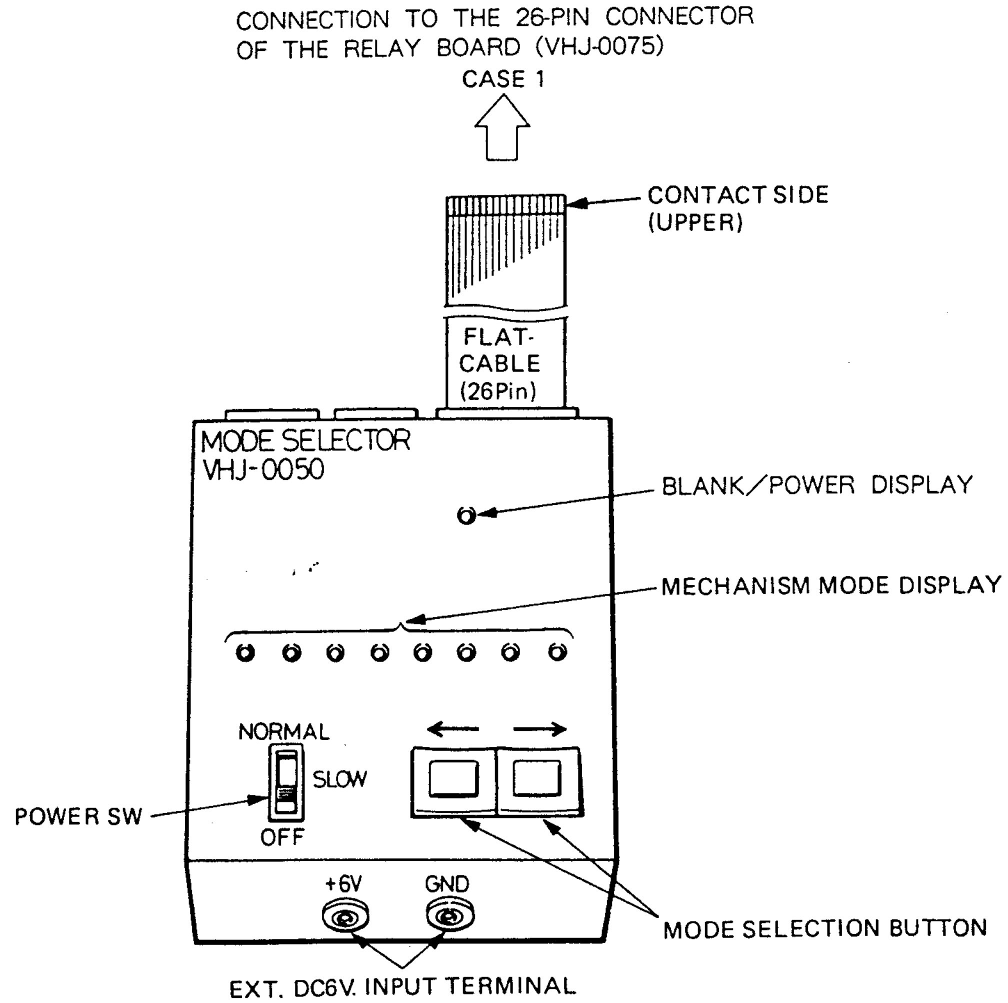


No. 18

4-2. MODE SELECTOR (VHJ-0050) HANDLING INSTRUCTIONS

The mode selector drives the loading motor of the P88 mechanism with its internal batteries (UM-2 × 4 = 6V), using LEDS to indicate the mode (EJECT, INITIAL, BRAKE, STOP/REW/FWD, STILL, PLAY, IDLER, REV) simultaneously with EJECT⇔REV mode changes.
Instead of the internal batteries, an external DC 6V power supply can also be used.

4-2-1. Part Names (See Fig. 4-2-1)



CONNECTION TO THE 26-PIN CONNECTOR
OF THE RELAY BOARD (VHJ-0075)
CASE 1
CONTACT SIDE (UPPER)
FLAT-CABLE (26Pin)
MODE SELECTOR VHJ-0050
BLANK/POWER DISPLAY
MECHANISM MODE DISPLAY
NORMAL
SLOW
OFF
POWER SW
+6V
GND
MODE SELECTION BUTTON
EXT. DC6V. INPUT TERMINAL

Fig. 4-2-1

4-2-2. Connection Method 1 (See Fig. 4-2-2) (For "Mid mount" model)

1) Remove the 7-wire cable connected from the system control circuit to the connector (CN822) of the MC-3 board.
2) Connect the 7-wire cable (VHJ-0076) between the connector (CN822) of the MC-3 board and the 7-pin connector of the Mode Selector Connection Board (VHJ-0075).
3) Remove the 6-wire cable extending from the cassette holder section from the connector of the System Control Circuit Board and connect it to the 6-pin connector of the Mode Selector Connection Board (VHJ-0075).
4) Connect a supplied 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) between the mode selector body and the 26-pin connector of the Connection Board (VHJ-0075).

Note: Care should be taken to avoid mistaking the direction of the contacting side when connecting a flexible flat cable.

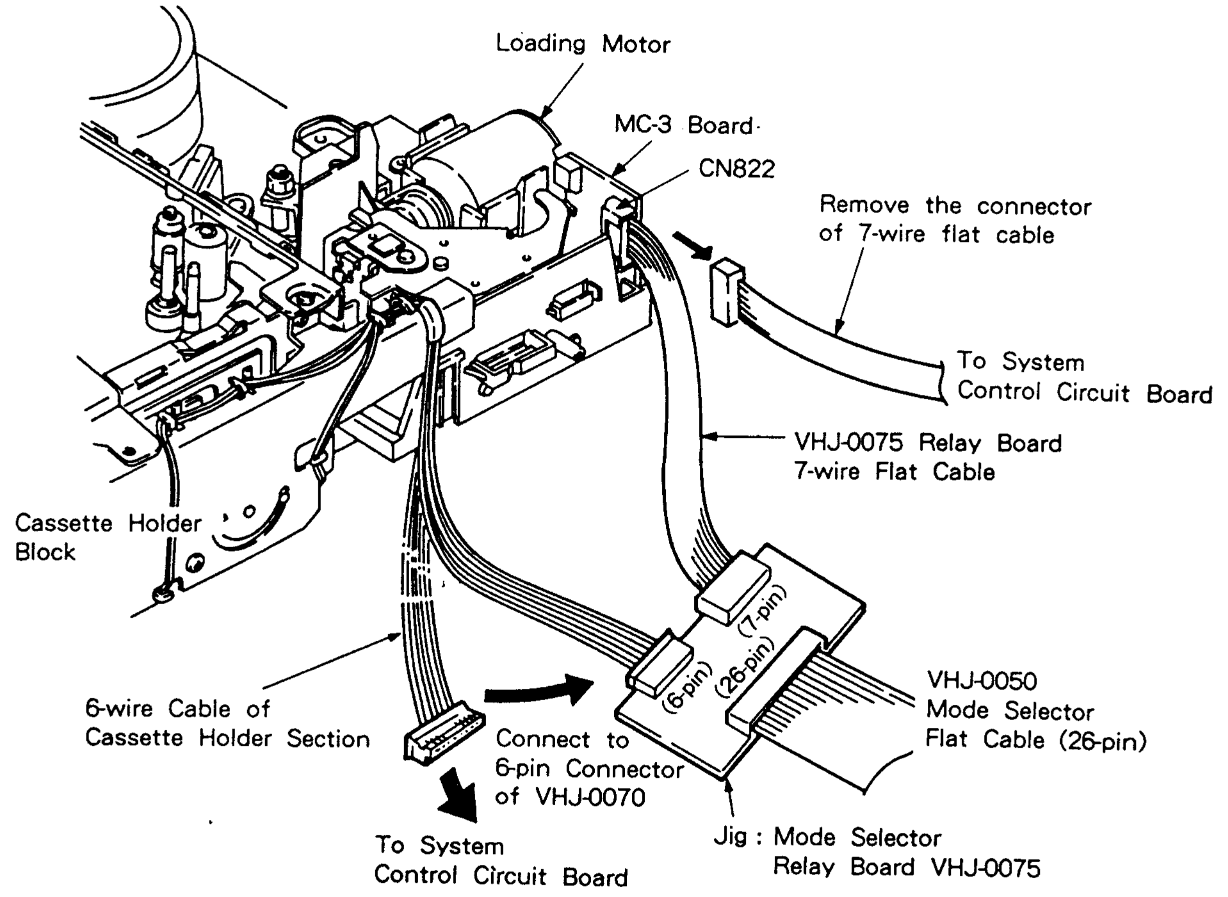

Loading Motor
MC-3 Board
CN822
Remove the connector of 7-wire flat cable
To System Control Circuit Board
VHJ-0075 Relay Board 7-wire Flat Cable
Cassette Holder Block
(7-pin)
(26-pin)
(6-pin)
VHJ-0050 Mode Selector Flat Cable (26-pin)
6-wire Cable of Cassette Holder Section
Connect to 6-pin Connector of VHJ-0070
To System Control Circuit Board
Jig : Mode Selector Relay Board VHJ-0075

Fig. 4-2-2. Connection

4-2-3. Connection Method 2 (See Fig. 4-2-3) (For compact size model)

1) Remove the 24-pin flat cable extending from the COMPL MC-2 board connector (CN811) from the connector of the system control circuit board, and connect it to the 24-pin connector of mode selector relay board (VHJ-0089).
2) Remove the 6-wire cable extending from the cassette holder section from the connector of the MC-2 board connector (CN817), and connect it to the 6-pin connector of the mode selector relay board (VHJ-0089).
3) Connect a supplied 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) between the mode selector body and the 26-pin connector of the mode selector relay board (VHJ-0089).

Note: Care should be taken to avoid mistaking the direction of the contacting side when connecting a flexible flat cable.

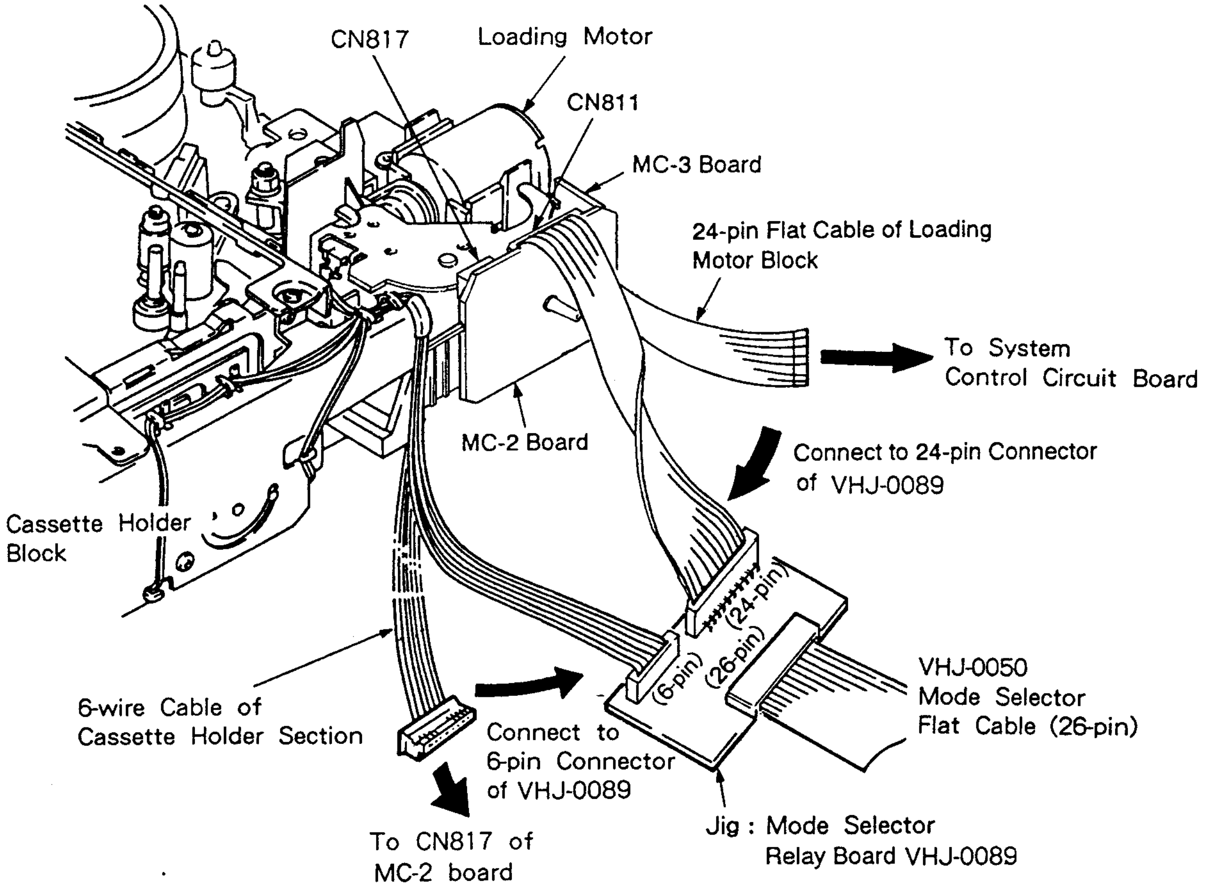

CN817
Loading Motor
CN811
MC-3 Board
24-pin Flat Cable of Loading Motor Block
To System Control Circuit Board
MC-2 Board
Connect to 24-pin Connector of VHJ-0089
Cassette Holder Block
(24-pin)
(26-pin)
(6-pin)
VHJ-0050 Mode Selector Flat Cable (26-pin)
6-wire Cable of Cassette Holder Section
Connect to 6-pin Connector of VHJ-0089
To CN817 of MC-2 board
Jig : Mode Selector Relay Board VHJ-0089

Fig. 4-2-3. Connection

4-2-4. Handling Method

1) Keep the right side (⇨) of the mode selector key pressed, and the mode will change in the following sequence: EJECT⇨INITIAL⇨BRAKE⇨STOP/REW/FWD⇨STILL⇨PLAY⇨IDLER⇨REV.
2) When changing the mode in the REV···⇨EJECT direction, press the left side (⇦) of the mode selector key until the desired mode is indicated.
3) In the mid position of each mode during a shift to other mode, the "BLANK" LED lights. But the "PLAY", "IDLER", "REV" LEDs light between the EJECT mode and the INITIAL mode. Be sure therefore to check the mechanism body to see just what state the mechanism is in.
   Incidentally, if the mode selector is not connected to the mechanism, the "BLANK" LED lights to indicate the power ON.
4) The SLOW position of POWER switch makes relatively slow motions in comparison with the NORMAL position.

Note 1: The mode selector drives the loading motor only, not affecting the head drum motor and the capstan motor. When using the mode selector with a cassette loaded, turn the capstan motor manually to remove tape slackness, preventing tape entanglement.

Note 2: If the left side (⇦) of the mode selector (VHJ-0050) key is kept pressed with the COMPL cassette mechanism removed, it might get past the EJECT position, causing the front helical gear and the front worm gear to get disengaged.

In this condition, since the front helical gear will not turn even if the right side (⇨) of the mode selector key is pressed, rotate (push) the front helical gear clockwise by hand and engage it with the front worm gear. In this condition, as there is a misalignment between the mechanism main body operation mode (indicated by the mode selector indicator lamps) and the front loading mechanism operation mode, keep the right side (⇨) of the mode selector key pressed until the front helical gear and the front loading gear of the front loading mechanism get back to the initial condition (Refer to A and B in Fig. 4-5-5 of section 4-5-2. Loading Motor).

When the front loading mechanism returns to the initial condition, operation mode of the whole mechanism gets back to normal, matching the mode shown by the mode selector indicator lamps (mode is not properly indicated, however, during EJECT to INITIAL).

Sometimes, engagement of the front helical gear with the front worm gear is delayed, operation mode of the mechanism main body gets too much ahead and the front loading mechanism mode cannot be switched to the initial condition. In that case, press the left side (⇦) of the mode selector key, setting the mechanism main body operation mode back to EJECT (rotation of the mode cam and the MAIN CAM stops).

Note 3: The mode selector indicator lamps show the mechanism operation mode, but the EJECT lamp may sometimes fail to indicate the actual mechanism operation mode.

5. MECHANISM DISMANTLING AND REASSEMBLING

5-1. MECHANISM MAIN UNIT (See Fig. 5-1-1.)

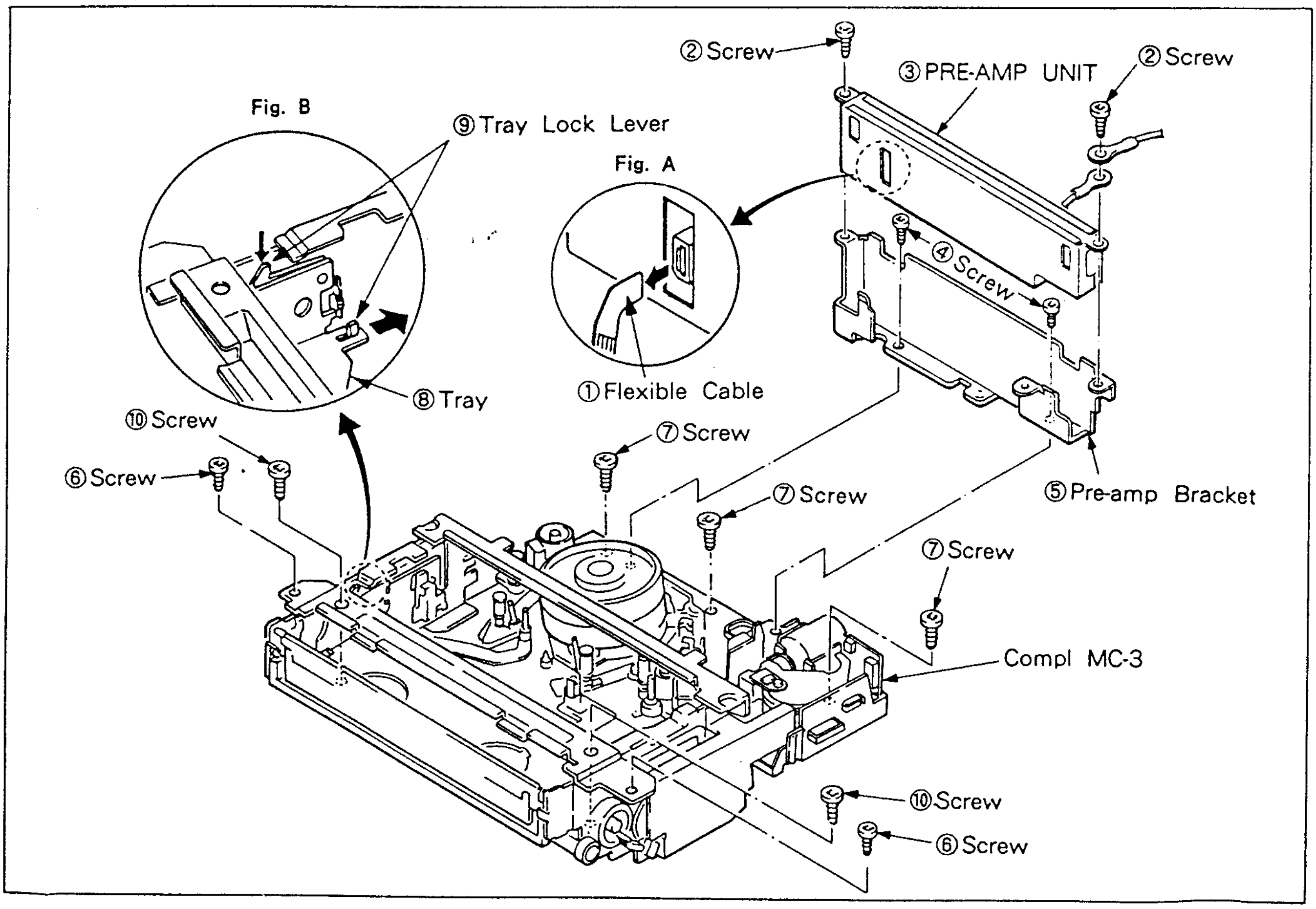
1. Removal

1) Remove the connectors of the COMPL MC-3 and the COMPL HEAD BRACKET.
2) Remove the flexible cable ① connecting the COMPL CYLINDER to the PRE-AMP UNIT ③ (See Fig. A).
3) Remove the two screws ②, then remove the PRE-AMP UNIT ③.
4) Remove the screw ④, then remove the PRE-AMP. BRACKET ⑤.
5) Remove the two screws ⑥.
6) Remove the three screws ⑦ and two screws ⑩, then lift up the mechanism main unit and remove it.
   Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws. (See Fig. B)

Note : Shape of the PRE-AMP UNIT ③ and the PRE-AMP. BRACKET ⑤ differ depending on the model.

2. Remounting

1) Mount the mechanism main unit onto the chassis with the three screws ⑦ and two screws ⑩.
2) Tighten the two screws ⑥.
3) Mount the PRE-AMP. BRACKET ⑤ with the two screws ④.
4) Mount the PRE-AMP UNIT ③ and the ground lug with the two screws ② (some models are not provided with a ground lug).
5) Insert the flexible cable ① into the connector of the PRE-AMP UNIT.
6) Connect the connectors of COMPL MC-3 and COMPL HEAD BRACKET.



② Screw
③ PRE-AMP UNIT
② Screw
Fig. B
⑨ Tray Lock Lever
Fig. A
④ Screw
⑧ Tray
① Flexible Cable
⑩ Screw
⑦ Screw
⑥ Screw
⑦ Screw
⑤ Pre-amp Bracket
⑦ Screw
Compl MC-3
⑩ Screw
⑥ Screw

Fig. 5-1-1 Mecahnism Main Unit

5-2. CASSETTE HOLDER MECHANISM

5-2-1. COMPL Cassette Mechanism (See Fig. 5-2-1.)

1. Removal

1) Set the video main unit to the EJECT completed mode.
2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
3) Remove the two screws ①.
4) Remove the two screws ②.
5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front (See Fig. B). When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting

1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from above, match the front loading gear hole ⑤ with the MOTOR HOLDER hole ⑥ as shown in Fig. A).
2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance.
   Match positions of the FRONT LOADING GEAR △ mark ⑦ and the RACK EJECT mark ⑧. (See Fig. A.)
4) Fix to the mechanism chassis with the two screws ②.
5) Fix to the chassis with the screw ①.
6) Connect to the various connectors.

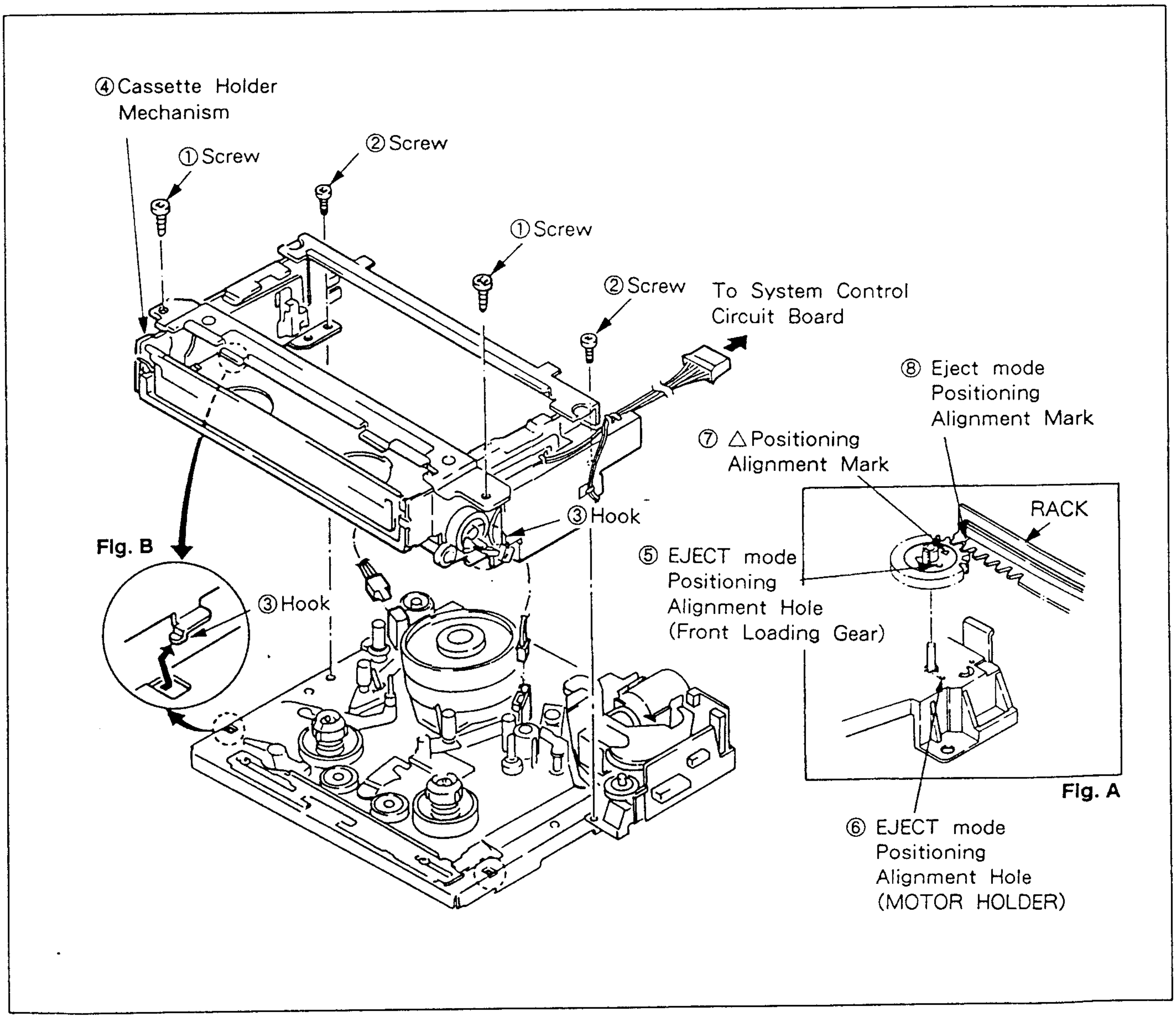

④Cassette Holder Mechanism
①Screw
②Screw
①Screw
②Screw
To System Control Circuit Board
⑧ Eject mode Positioning Alignment Mark
⑦ △Positioning Alignment Mark
RACK
③Hook
⑤ EJECT mode Positioning Alignment Hole (Front Loading Gear)
Fig. B
③Hook
Fig. A
⑥ EJECT mode Positioning Alignment Hole (MOTOR HOLDER)

Fig. 5-2-1 Compl Cassette Mechanism

5-2-2. Gear Bracket Ass'y (See Fig. 5-2-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the three screws ①, then remove the GEAR BRACKET ASS'Y ② as shown in Fig. A.
3) Remove the E ring ③, then remove the LOCK GEAR ④, the PINION LEVER ASS'Y ⑤, the PINION GEAR ⑥ and the RACK ⑦, in that order.

2. Remounting

1) Apply grease to the shaft ⑧ and the two pins ⑨ of the GEAR BRACKET ASS'Y.
2) Apply grease to the pin ⑩ of the PINION LEVER ASS'Y.
3) Apply grease to the toothed part of the RACK ⑦.
4) Fit the RACK ⑦ onto the two pins ⑨. Align the positioning alignment hole ⑪ to the positioning alignment hole ⑫ of the GEAR BRACKET.
5) Mount the PINION GEAR ⑥, PINION LEVER ASS'Y ⑤, and LOCK GEAR ④ in the shaft ⑧ in the order mentioned.
   Align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑪ of RACK at that time.
6) Mount the E ring ③ onto the shaft ⑧.
7) Set the GEAR BRACKET ASS'Y ② to the dowel and mount it using three screws ①.
   Align the positioning alignment hole Ⓐ of the IDLER GEAR with the positioning alignment hole Ⓑ of the SIDE BOARD as shown in Fig. 5-2-3 at this time.
   Also align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑫ of GEAR BRACKET by referring to Fig. 5-2-2. After mounting them, check to be sure that FL START SWITCH ⑭ is in the ON state shown in Fig. A.
8) Remount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

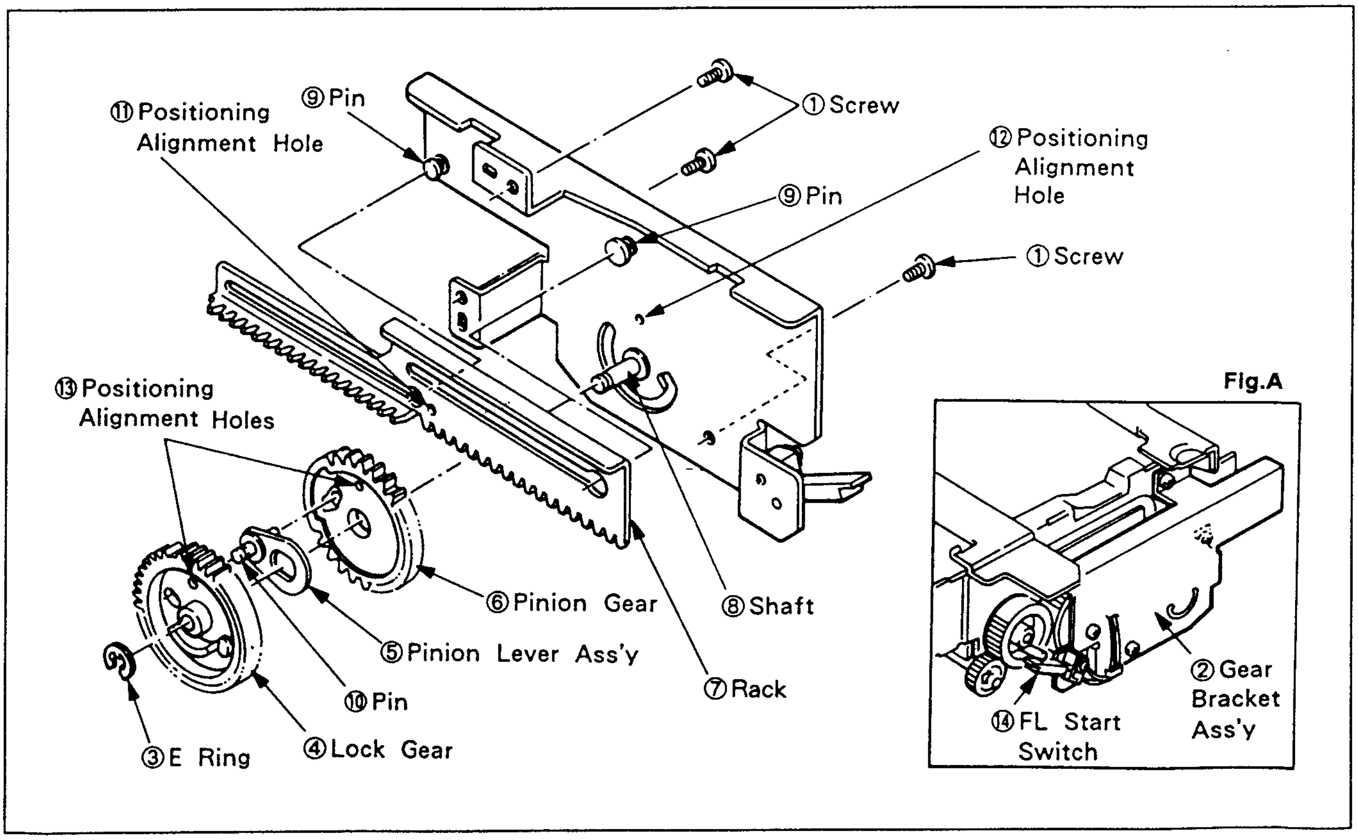

⑪ Positioning Alignment Hole
⑨ Pin
① Screw
⑫ Positioning Alignment Hole
⑨ Pin
① Screw
⑬ Positioning Alignment Holes
⑥ Pinion Gear
⑧ Shaft
⑤ Pinion Lever Ass'y
⑩ Pin
⑦ Rack
③ E Ring
④ Lock Gear
Fig.A
② Gear Bracket Ass'y
⑭ FL Start Switch

Fig. 5-2-2. Gear Bracket Ass'y

5-2-3. Cassette Drive Gear (Right) (See Fig. 5-2-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in 5-2-1. and 5-2-2., respectively.
2) Remove the IDLER GEAR ①.
3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.
5) Open the hook ⑥ and remove the COUPLE GEAR R ⑦. Take care not to open the hook ⑥ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the IDLER GEAR R ⑧.

2. Remounting

1) Apply grease to gear parts that undergo friction.
2) Mount the IDLER GEAR R ⑧ onto the axle ⑨.
3) Mount the COUPLE GEAR R ⑦ onto the ROD ASS'Y axle ⑩. When doing so, match the couple gear position with the IDLER GEAR R ⑧ as shown in Fig. A.
4) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Match position to the IDLER GEAR R ⑧ as shown in Fig. A.
5) Mount the E ring ④ onto the axle ⑫.
6) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, match position to the IDLER GEAR R ⑧ as shown in Fig. A.
7) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR R ③ and the LEVER GEAR ASS'Y R.
8) Mount the IDLER GEAR ① onto the axle ⑭. When doing so, match position to the MAIN GEAR as shown in Fig. A.
9) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM ASS'Y as instructed in 5-2-2. and 5-2-1., respectively.

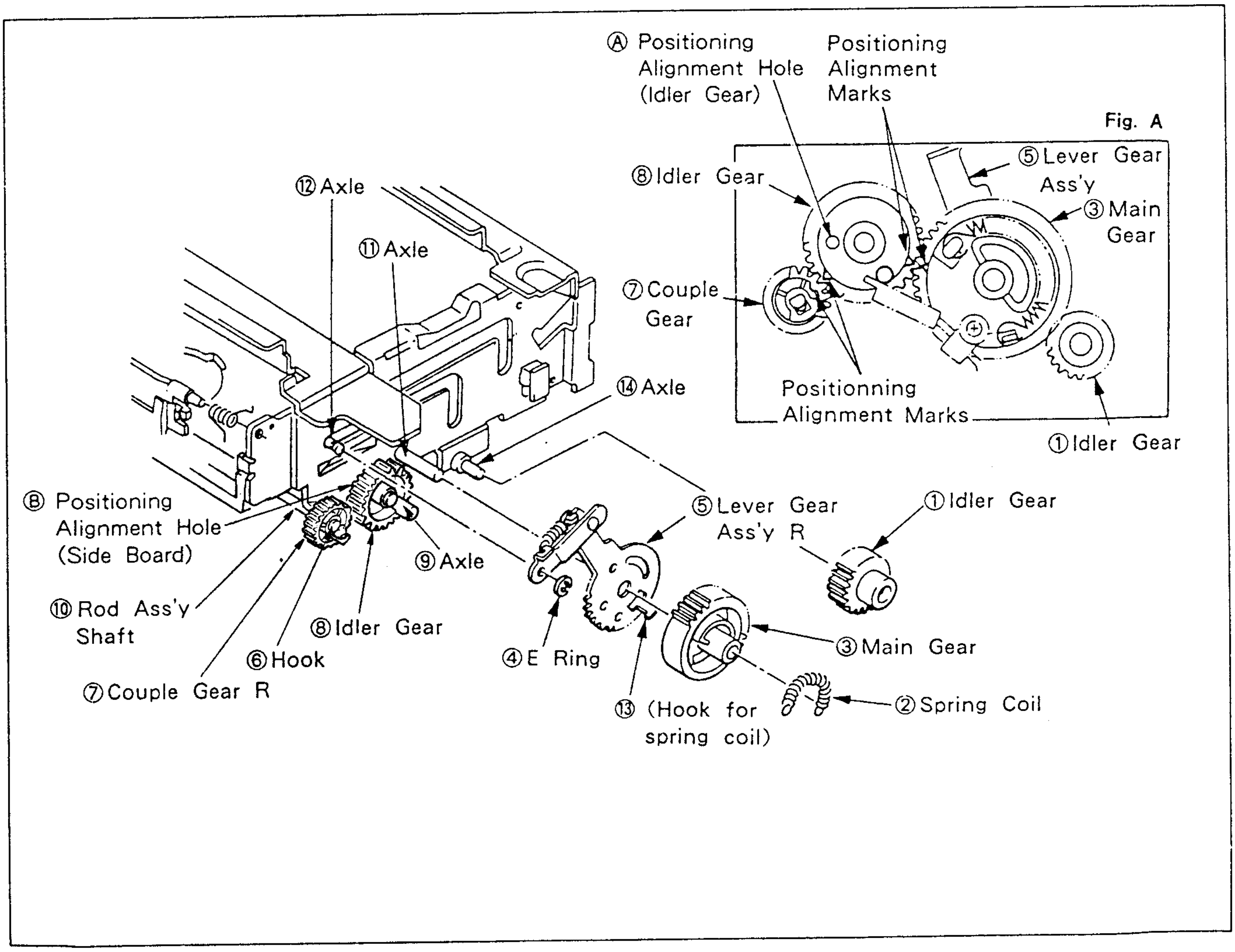

Ⓐ Positioning Alignment Hole (Idler Gear)
Positioning Alignment Marks
Fig. A
⑧Idler Gear
⑤Lever Gear Ass'y
③Main Gear
⑦Couple Gear
Positionning Alignment Marks
①Idler Gear
⑫Axle
⑪Axle
⑭Axle
Ⓑ Positioning Alignment Hole (Side Board)
⑨Axle
⑤Lever Gear Ass'y R
①Idler Gear
⑩Rod Ass'y Shaft
⑧Idler Gear
⑥Hook
④E Ring
③Main Gear
⑦Couple Gear R
⑬ (Hook for spring coil)
②Spring Coil

Fig. 5-2-3. Cassette Drive Gears (Right Side)

5-2-4. Cassette Drive Gear (left) (See Fig. 5-2-4)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the E ring ②.
3) Open the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
4) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y L ④.

2. Remounting

1) Apply grease to the axle ⑨ and shaft ⑩.
2) Align with the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig B.
3) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
4) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Align with the IDLER GEAR L ⑥ as shown in Fig. B.
5) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in 5-2-1.

Note: The end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.

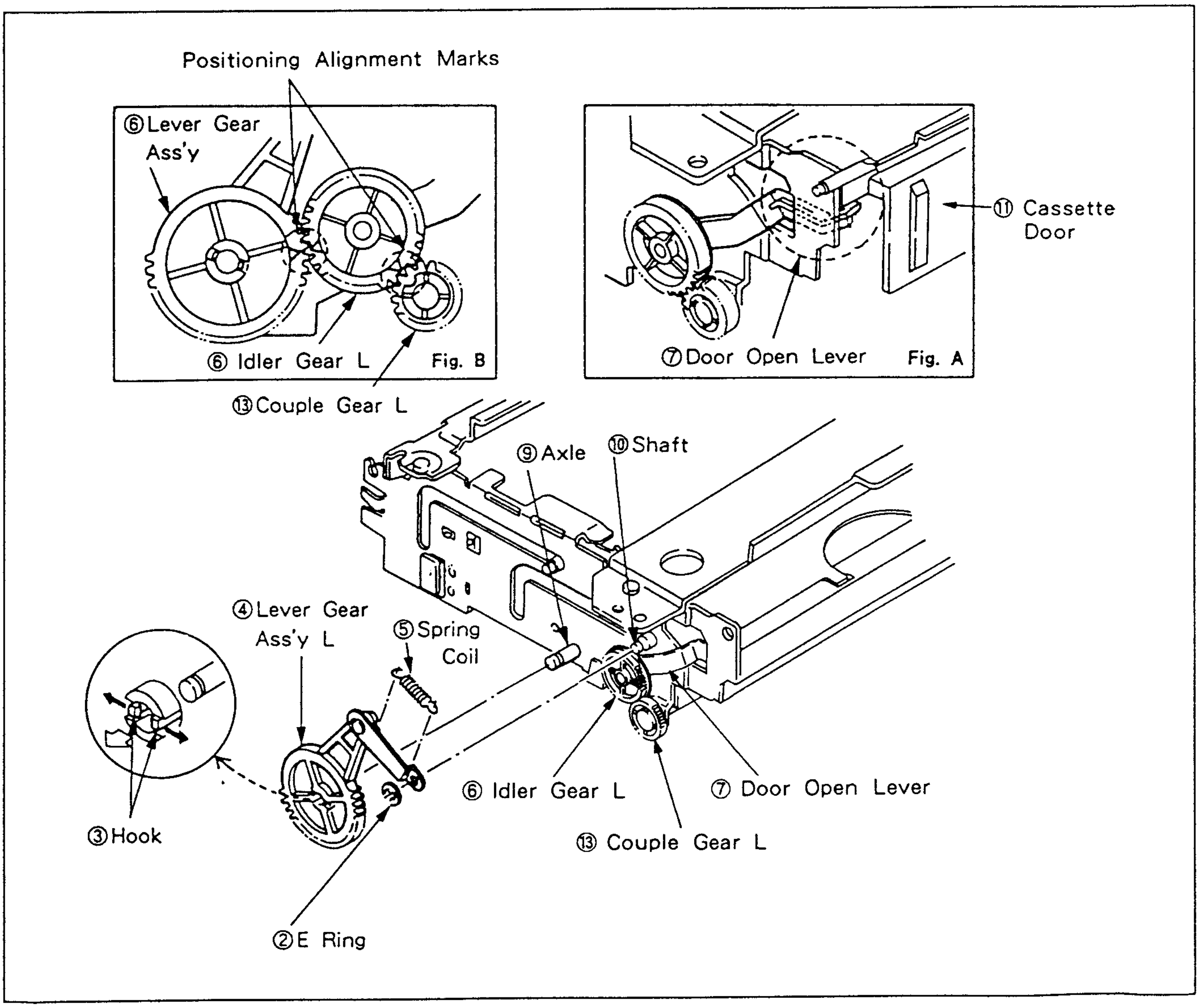

Positioning Alignment Marks
⑥Lever Gear Ass'y
⑥ Idler Gear L
Fig. B
⑬Couple Gear L
⑪ Cassette Door
⑦Door Open Lever
Fig. A
⑨Axle
⑩Shaft
④Lever Gear Ass'y L
⑤Spring Coil
③Hook
⑥ Idler Gear L
⑦ Door Open Lever
⑬ Couple Gear L
②E Ring

Fig. 5-2-4. Cassette Drive Gears (Left Side)

5-2-5. FL Start Switch (See Fig. 5-2-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the screw ①.
3) Remove the lead wire of the FL START SWITCH ②.

2. Remounting

1) Solder the lead wire to the FL START SWITCH ② terminal.
2) Align the FL START SWITCH ② protuberance to the hole ⑤, then mount it onto the GEAR BRACKET ASS'Y ③ with the screw ①. Do it so that the FL START SWITCH ② is turned ON by holding the pin ④ of IDLER GEAR in the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

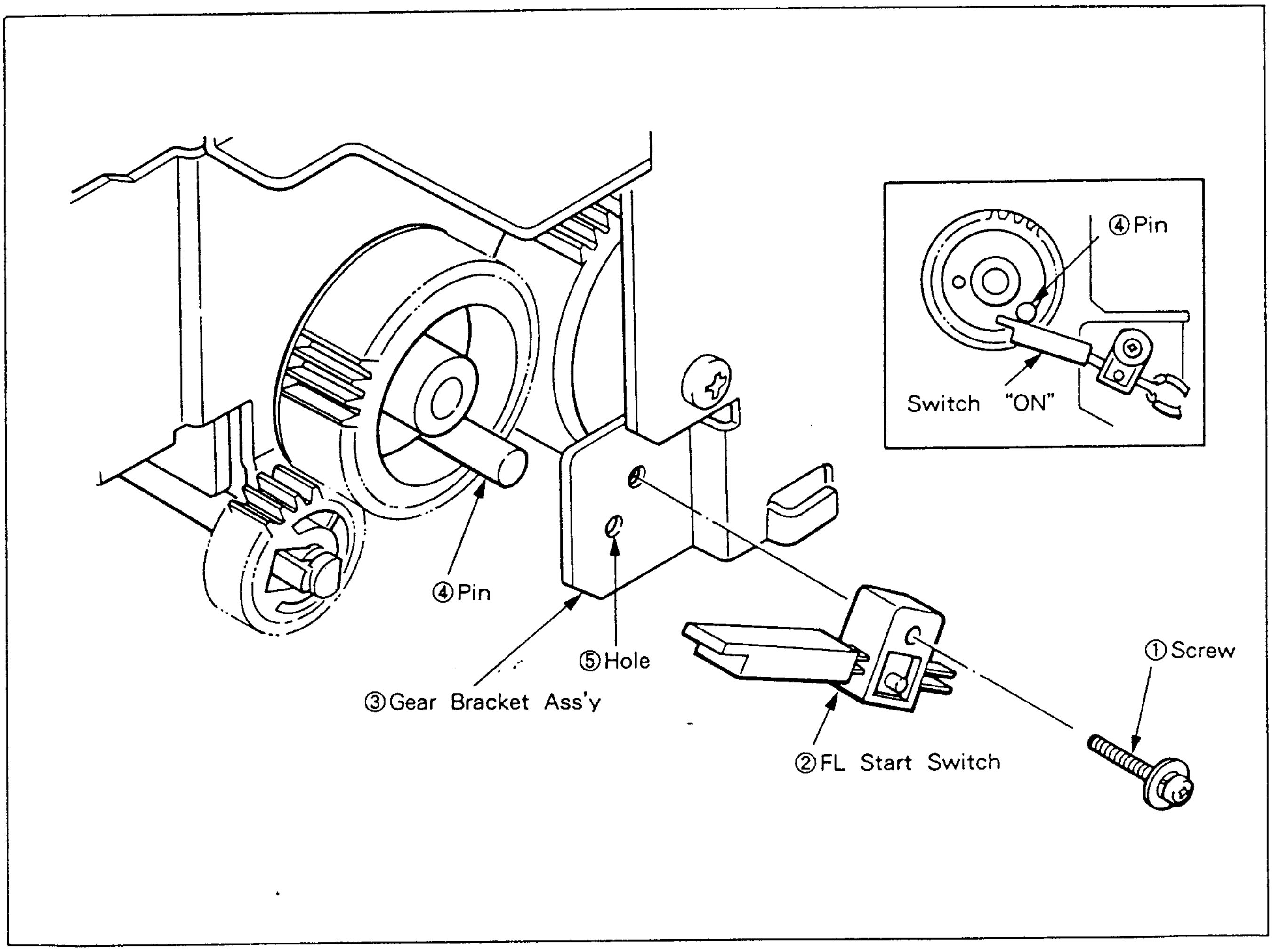

④Pin
Switch "ON"
④Pin
⑤Hole
③Gear Bracket Ass'y
①Screw
②FL Start Switch

Fig. 5-2-5. FL Start Switch

5-2-6. T-Top Sensor, T-End Sensor (See Fig. 5-2-6.)

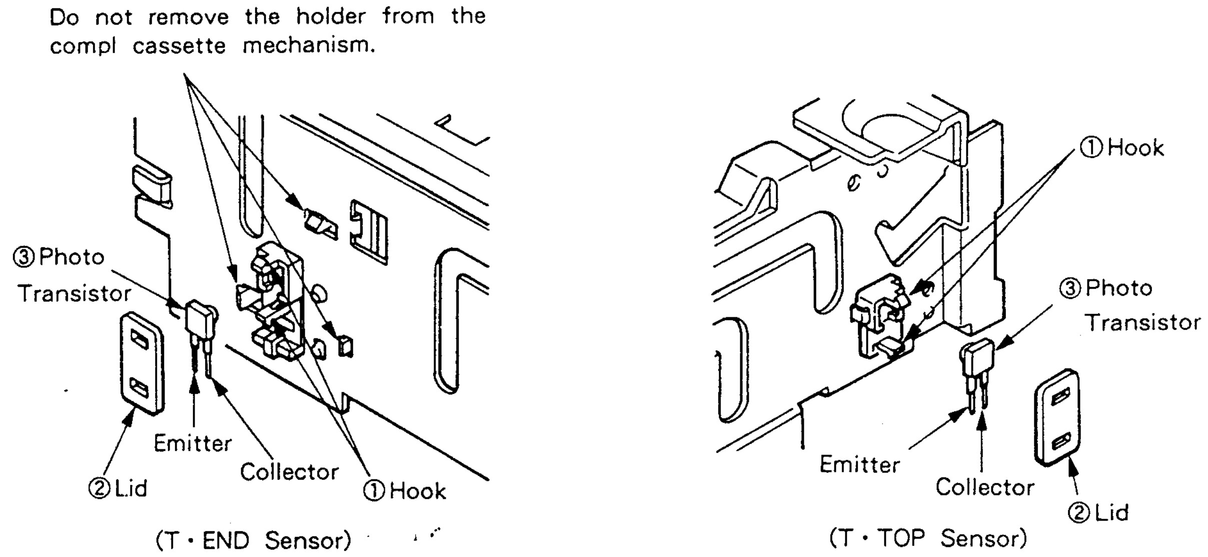
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) When removing the T-TOP SENSOR, remove the GEAR BRACKET ASS'Y as instructed in 5-2-2.
3) Unhook the hook ① as instructed in Fig. A, then remove the LID ②. Take care not to push the hook ① too much, otherwise it may be deformed or broken.
4) Remove the phototransistors ③, then remove the lead wire.

Note : Mounting position of the transistor holder on the T-END SENSOR side is precisely adjusted at the factory, so do never remove it from the COMPL CASSETTE MECHANISM.

2. Remounting

1) Solder the brown lead wire to the emitter side, and the red lead wire to the collector side of the T-TOP SENSOR phototransistor ③.
   Solder the orange lead wire to the emitter side, and the yellow lead wire to the collector side of the T-END SENSOR phototransistor.
2) Mount the phototransistors ③ onto their respective holders.
3) Mount the LID ② and fix it with the hook ①.
4) Mount the GEAR BRACKET ASS'Y as instructed in 5-2-2.
5) Mount the COMPL CASSETTE MECHANISM as insturcted in 5-2-1.


Do not remove the holder from the compl cassette mechanism.

(T・END Sensor)

(T・TOP Sensor)

Fig. A

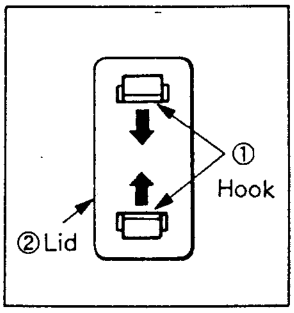


Fig. 5-2-6. T TOP Sensor & T END Sensor

5-3. COMPL HOLDER MOTOR (LOADING MOTOR BLOCK)

5-3-1. COMPL Motor Bracket

1. Removal

1) Remove the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.
2) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
3) Remove the two screws ① and the other one ⑩, then remove the COMPL HOLDER MOTOR ② (see Fig. 5-3-1.).

2. Remounting

1) Set the mechanism chassis to the INITIAL mode. In this mode, look at the mechanism chassis positioning holes ③ just from above and align the MAIN CAM ④ and MODE CAM ⑤ positioning holes as shown in Fig. A.
2) Set the COMPL HOLDER MOTOR ② to the INITIAIL mode with the mode selector (VHJ-0050). In this position, the FRONT LOADING GEAR △ mark ⑥ is aligned with the MOTOR HOLDER INITIAL mode position mark ⑦ (see Fig. B.).
3) Align the ROTARY SWITCH (mode detector switch) ⑧ with the INITIAL mode position mark ⑨ (see Fig. C.).
4) Align the COMPL HOLDER MOTOR main unit ② with the protuberance ⑪, then mount it with the two screws ① and the other one ⑩.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
6) Mount the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.

Note : Normal mechanism operation cannot be achieved if initial positioning of the MAIN CAM ④, the MODE CAM ⑤ and the ROTARY SWITCH (mode detector switch) ⑧ are not performed precisely.

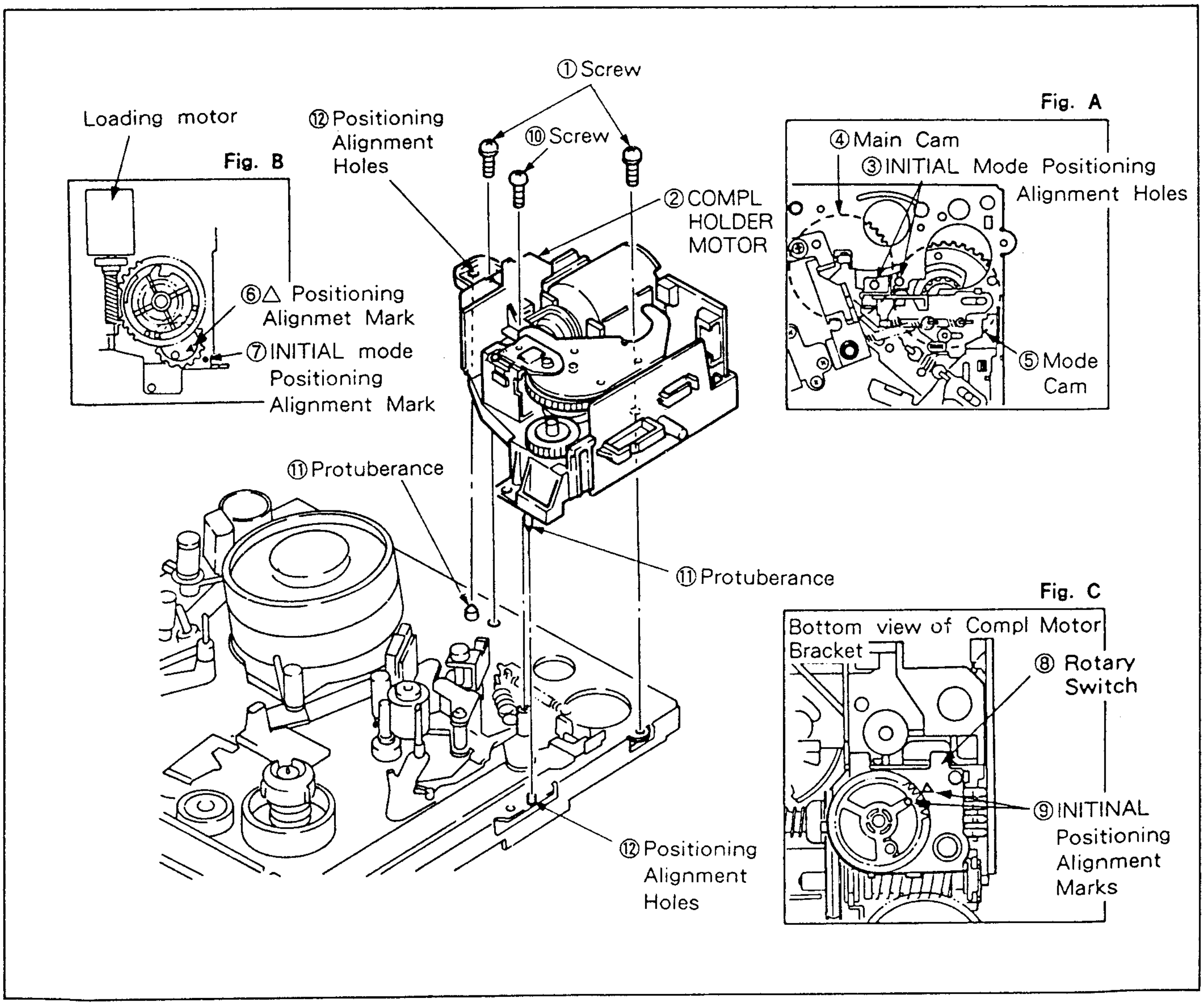

①Screw
⑩Screw
Loading motor
Fig. B
⑫Positioning Alignment Holes
②COMPL HOLDER MOTOR
⑥△ Positioning Alignmet Mark
⑦INITIAL mode Positioning Alignment Mark
⑪Protuberance
⑪Protuberance
⑫Positioning Alignment Holes
Fig. A
④Main Cam
③INITIAL Mode Positioning Alignment Holes
⑤Mode Cam
Fig. C
Bottom view of Compl Motor Bracket
⑧ Rotary Switch
⑨INITINAL Positioning Alignment Marks

Fig. 5-3-1 Compl Holder Motor

5-3-2. Loading Motor (Refer to Fig. 5-3-2.)

1. Removal

LOADING MOTOR can be replaced after LOADING MOTOR BLOCK unit has been removed by referring to 5-3-1. The 1990 version of the mechanism allows LOADING MOTOR itself to be replaced without removing CASSETTE HOLDER BLOCK and LOADING MOTOR BLOCK. The following describes this procedure.

1) Use MODE SELECTOR (VHJ-0050) to set the mechanism to the initial mode.
2) Remove the connector for DEW SENSOR connected to the MC-3 board ①.
3) Remove three screws ② and remove HOLDER BRACKET ④ with FRONT WORM ASS'Y ③ still attached.
4) Remove DAMPER ⑥ attached to the pulley of LOADING MOTOR ⑤.
5) Remove FRONT HELICAL GEAR ⑦ and WASHER ⑧.
6) Remove soldered LEAD WIRE from the terminal of LOADING MOTOR ⑤.
7) Remove LOADING BELT ⑨.
8) Remove LOADING MOTOR ⑤ by lifting up from the back terminal side.

2. Remounting

Before attaching LOADING MOTOR ⑤ to MOTOR BRACKET ASS'Y ⑩, confirm DAMPER ⑪ and DAMPER ⑫ shown in Fig. 5-3-5. are in the proper position on MOTOR BRACKET ASS'Y ⑩.

1) LOADING MOTOR ⑤ puts REAR SIDE BOSS ㉓ in the slit ㉔ of MOTOR HOLDER ⑩.
   Further, mount the tap hole ⑬ at two points of the front pulley side so that the it is secured to the PROTUBERANCE ⑭ of the MOTOR HOLDER at two points.
2) Solder the lead wire from the MC-3 board to LOADING MOTOR ⑤ terminal. (Solder the red lead wire to the positive terminal side.)
3) Hang LOADING BELT ⑨ on the pulley.
4) After hanging BELT ⑨ on the pulley, confirm that the mechanism unit is in the initial mode. The initial mode is indicated by Fig. A of Fig. 5-3-2., and is the position in which INITIAL POSITIONING ALIGNMENT HOLEs of MAIN CAM ⑮ and MODE CAM ⑯ are lined up with THROUGH HOLE ⑰ of MOTOR HOLDER. If the initial mode is not selected, adjust with MODE SELECTOR (VHJ-0050).
5) As shown in Fig. B, confirm the positions of the △ POSITIONING ALIGNMENT MARK on FRONT LOAD GEAR ⑱ and INITIAL MARK ⑲ position of MOTOR HOLDER and the position relationship of CASSETTE HOLDER RACK ⑳.
6) Apply a light coat of grease to the entire sides of AXLE ㉑ and FRONT HELICAL GEAR ⑦.
7) Attach FRONT HELICAL GEAR ⑦ and WASHER ⑧ to AXLE ㉑. As shown in Fig. C, FRONT HELICAL GEAR ⑦ is attached so that the indent on the side is inside PIN ㉒ of FRONT LEVER ASS'Y.
8) Attach DAMPER ⑥ to LOADING MOTOR ⑤ pulley.
9) HOLDER BRACKET ④ is attached by engaging FRONT WORM ASS'Y ③ with LOADING MOTOR ⑤ pulley, and held in place with three screws ②.
10) Attach the connector of DEW SENSOR ㉕ to the MC-3 board ① and return the mechanism to the eject completion using MODE SELECTOR.

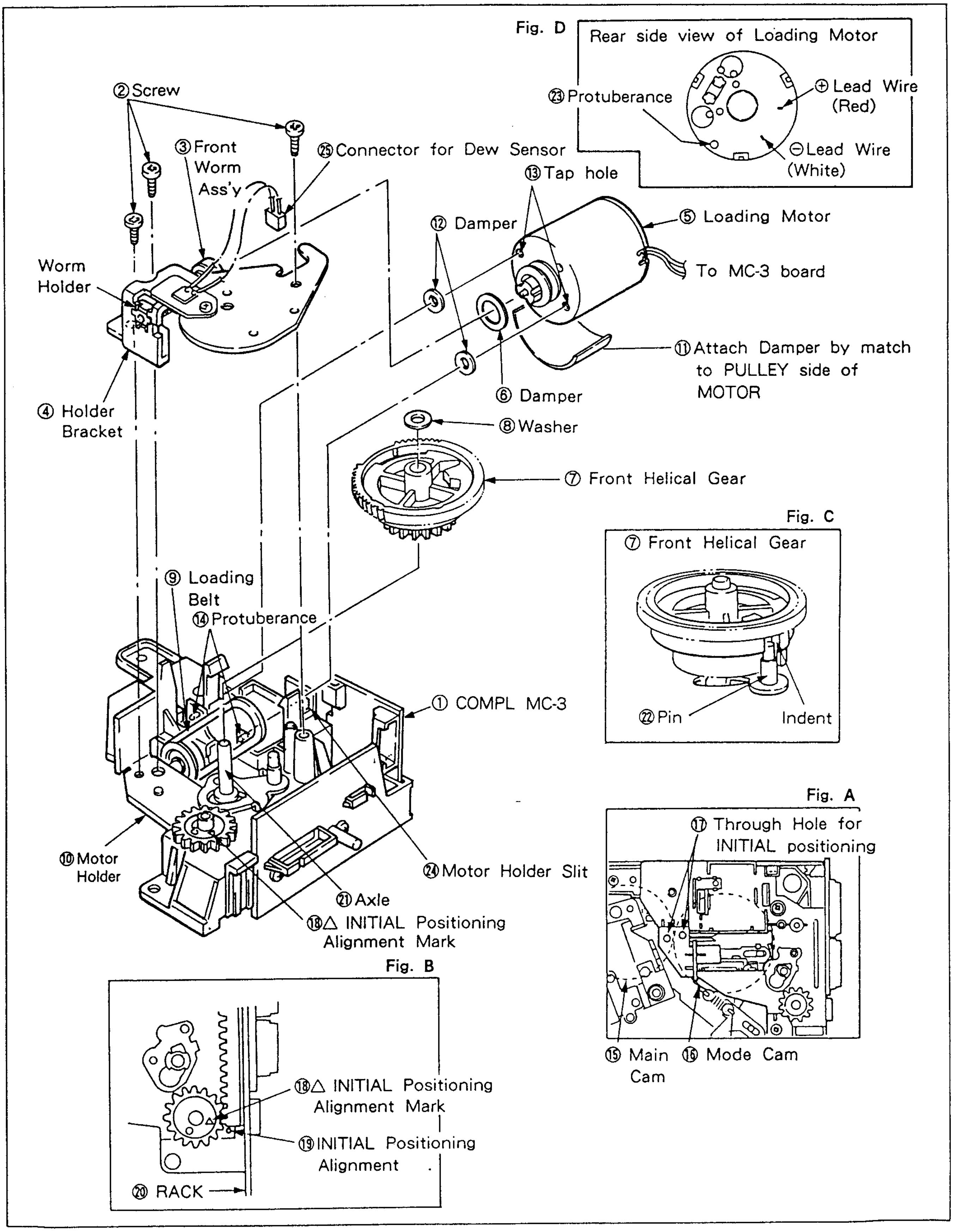


Fig. D
Rear side view of Loading Motor
㉓Protuberance
⊕Lead Wire
(Red)
⊖Lead Wire
(White)
②Screw
③Front
Worm
Ass'y
㉕Connector for Dew Sensor
⑬Tap hole
⑫ Damper
⑤ Loading Motor
To MC-3 board
Worm
Holder
⑪Attach Damper by match
to PULLEY side of
MOTOR
⑥ Damper
④ Holder
Bracket
⑧Washer
⑦ Front Helical Gear
Fig. C
⑦ Front Helical Gear
㉒Pin
Indent
⑨ Loading
Belt
⑭Protuberance
① COMPL MC-3
Fig. A
⑰ Through Hole for
INITIAL positioning
⑩Motor
Holder
㉔Motor Holder Slit
㉑Axle
⑱△ INITIAL Positioning
Alignment Mark
Fig. B
⑮ Main
Cam
⑯ Mode Cam
⑱△ INITIAL Positioning
Alignment Mark
⑲INITIAL Positioning
Alignment
⑳ RACK

Fig. 5-3-2. Loading Motor

5-4. TAPE LOADING MECHANISM

5-4-1. Main Parts of the Tape Loading Mechanism (See Fig. 5-4-1.)

1. Removal

1) Remove connectors from the DRUM MOTOR board (SV-5).
2) Remove the three screws ①, then remove the REINFORCE BRACKET ②.
3) Remove the three special washers ③ and ⑦, then remove the spacer ⑥, LOAD RACK ④ and MAIN CAM ⑧.
4) Unhook the LOAD GEAR T hook ⑩, then remove the LOAD GEAR T ⑨ as shown in Fig. A, with the SPRING COIL ⑪ and the LOAD LEVER ASS'Y T ⑫ attached to it.
5) Unhook the LOAD GEAR S hook ⑭, then remove the LOAD GEAR S ⑬ as shown in Fig. B, with the SPRING COIL ⑮ and the LOAD LEVER ASS'Y S ⑯ attached to it.

Note: Take care not to open the LOAD GEAR hooks too much, otherwise they may be deformed or broken. If they are, replace them.

2. Remounting

1) Apply grease to the hole ⑰ of the LOAD LEVER ASS'Y S ⑯, as shown in Fig. B.
2) Apply grease to the hole ㉒ of the LOAD LEVER ASS'Y T ⑫ as shown in Fig. A, and to the sections of the LOAD GEAR T ⑨ as indicated with an arrow in Fig. C.
3) Apply grease to GROOVE 1, GROOVE 2 and to the outer side of the MAIN CAM ⑧, shown in Fig. E.
4) Apply grease to the three oval holes of the LOAD RACK ④ as shown in Fig. D.
5) Apply grease to the outer surface of axles ⑲, ⑳ and ㉖.
6) After assembling as shown in Fig. B, mount the LOAD GEAR S ⑬ onto the axle ⑲. Insert the ROLLER BASE S pin ⑱ into the hole ⑰ of the LOAD LEVER ASS'Y S.
7) After assembling as shown in Fig. A, mount the LOAD GEAR T ⑨ onto the axle ⑳. When doing so, align the INITIAL mode positioning alignment holes ㉑ of the LOAD GEAR S ⑬ and the LOAD GEAR T ⑨ to the INITIAL mode position. Insert the ROLLER BASE T pin ㉓ into the hole ㉒ of the LOAD LEVER ASS'Y T ⑫.
8) Mount the MAIN CAM ⑧ onto the axle ㉖. At that time, make sure that the INITIAL mode positioning alignment holes ㉕ of the MAIN CAM ⑧ and the MODE CAM ㉔ match the INITIAL mode positioning alignment holes ㉞ of the MECHANISM CHASSIS. Also check to be sure that the pin ㉗ of the CAM PINCH LEVER ASS'Y is put in the GROOVE 1 of the MAIN CAM as shown in Fig. E.
9) Mount the LOAD RACK ④ onto the axles ㉖ and ㉛. At that time, set the INITIAL mode positioning alignment marks ㉚ of the LOAD RACK ④ and the LOAD GEAR T ⑨ to the INITIAL mode position. Insert the LOAD RACK pin ㉙ into the MAIN CAM GROOVE 2 as shown in Fig. E.
10) Mount the spacer ⑥ and the special washer ⑦ onto the axle ㉖.
11) Mount the two special washers ③ onto the two axles ㉛.
12) Mount the REINFORCE BRACKET ② with the three screws ①.
13) Insert the connector into the DRUM MOTOR board (SV-5).
14) Confirm that loading and unloading are performed smoothly.

Note: Be sure to perform INITIAL mode positioning of cams and gears precisely.

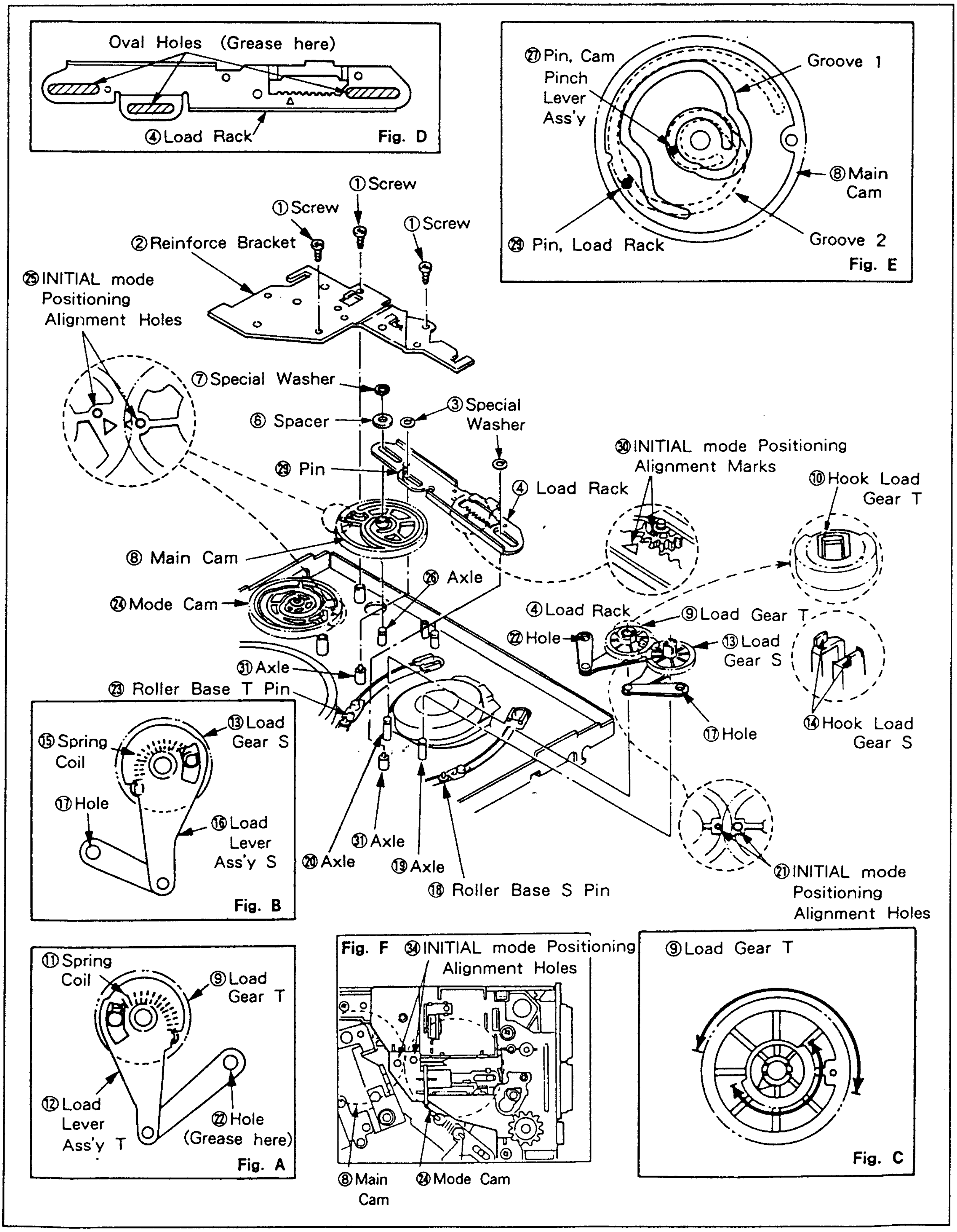

Oval Holes (Grease here)
④ Load Rack
Fig. D
㉗ Pin, Cam Pinch Lever Ass'y
Groove 1
⑧ Main Cam
㉙ Pin, Load Rack
Groove 2
Fig. E
① Screw
① Screw
① Screw
② Reinforce Bracket
㉕ INITIAL mode Positioning Alignment Holes
⑦ Special Washer
⑥ Spacer
③ Special Washer
㉙ Pin
㉚ INITIAL mode Positioning Alignment Marks
④ Load Rack
⑩ Hook Load Gear T
⑧ Main Cam
㉖ Axle
㉔ Mode Cam
④ Load Rack
⑨ Load Gear T
㉒ Hole
⑬ Load Gear S
㉛ Axle
㉓ Roller Base T Pin
⑰ Hole
⑭ Hook Load Gear S
⑮ Spring Coil
⑬ Load Gear S
⑰ Hole
⑯ Load Lever Ass'y S
Fig. B
㉛ Axle
⑳ Axle
⑲ Axle
⑱ Roller Base S Pin
㉑ INITIAL mode Positioning Alignment Holes
⑪ Spring Coil
⑨ Load Gear T
⑫ Load Lever Ass'y T
㉒ Hole (Grease here)
Fig. A
Fig. F
㉞ INITIAL mode Positioning Alignment Holes
⑧ Main Cam
㉔ Mode Cam
⑨ Load Gear T
Fig. C

Fig. 5-4-1. Loading Mechanism Main Parts

5-4-2. Mode Cam (See Fig. 5-4-2.)

1. Removal

1) Set the INITIAL mode with the mode selector (VHJ-0050).
2) Remove the REINFORCE BRACKET as instructed in 5-4-1.
3) Remove the two stop washers ①, then remove the CAM PLATE SLIDE ASS'Y ②.
4) Remove the MODE CAM ③.

2. Remounting

1) Referring to 5-4-1., confirm that the MAIN CAM is in the INITIAL mode position.
2) In case the MAIN CAM is misplaced, use the mode selector (VHJ-0050) to align the MAIN CAM positioning hole with the chassis INITIAL mode position hole (refer to 5-4-1. for the INITIAL mode position). Since the ROTARY SWITCH (mode detector switch) does not rotate, the mode selector indicator lamp will not show the correct mode.
3) Align the ROTARY SWITCH (mode detector switch) ④ with the INITIAL mode position mark ⑤ as shown in Fig. A.
4) Mount the MODE CAM ③ onto the axle ⑥. Do it so that the SLIDE CAM ASS'Y pin ⑪ is placed in the GROOVE 3 as shown in Fig. B.
5) Mount the CAM PLATE SLIDE ASS'Y ② onto the axles ⑥ and ⑦. Do it so that the pin ⑧ gets into the GROOVE 4 of the MODE CAM as shown in Fig. B, and the point ⑨ of the bent-up part into the ACT PLATE SLIDE ASS'Y hole ⑩.
6) Mount the two special washers ① onto the axles ⑥ and ⑦.
7) Mount the REINFORCE BRACKET as instructed in 5-4-1.

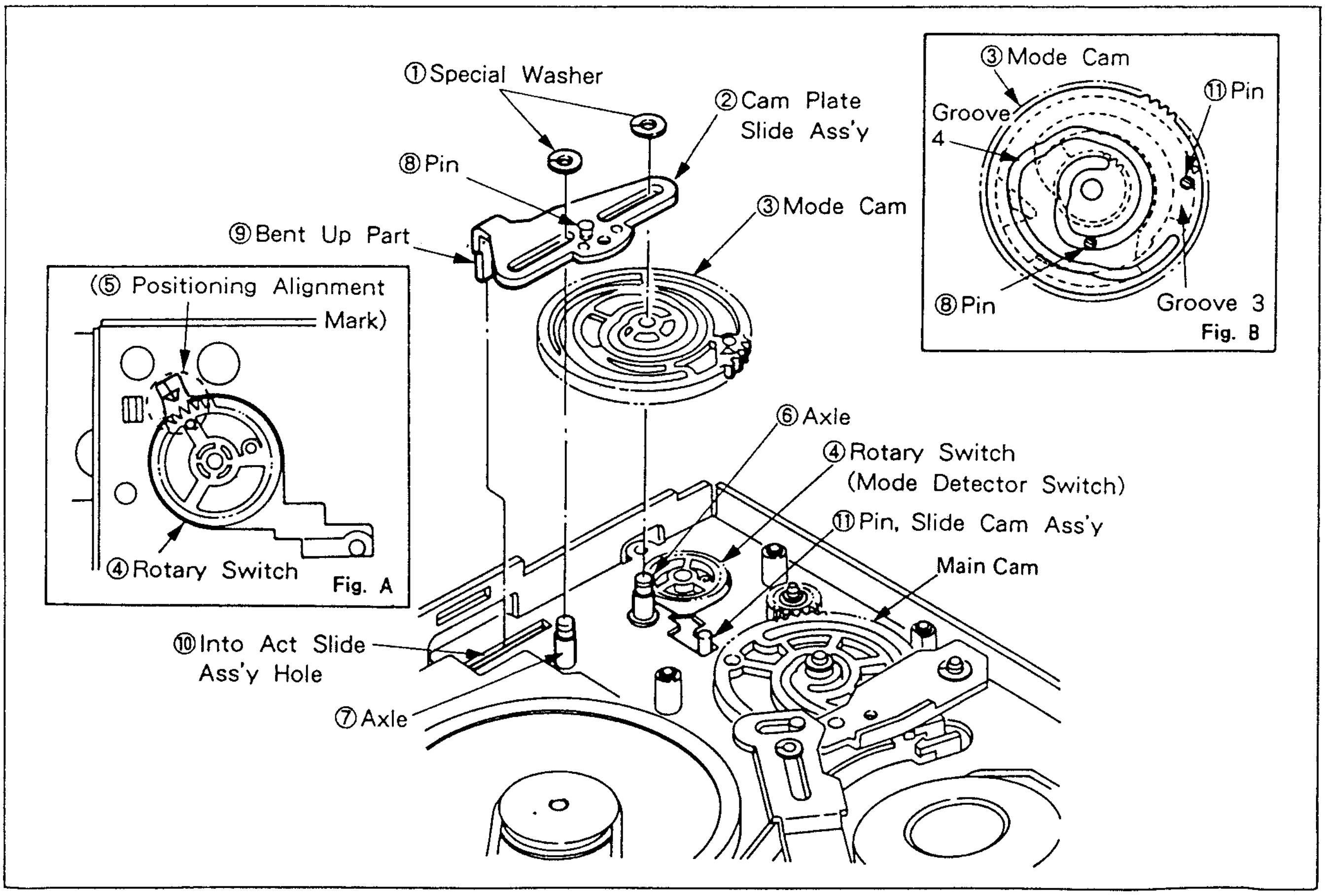

①Special Washer
②Cam Plate Slide Ass'y
⑧Pin
③Mode Cam
⑨Bent Up Part
(⑤ Positioning Alignment Mark)
④Rotary Switch
Fig. A
⑥Axle
④Rotary Switch (Mode Detector Switch)
⑪Pin, Slide Cam Ass'y
Main Cam
⑩Into Act Slide Ass'y Hole
⑦Axle
③Mode Cam
⑪Pin
Groove 4
⑧Pin
Groove 3
Fig. B

Fig. 5-4-2. Mode Cam

5-5. COMPL HEAD BRACKET (ACE HEAD) (See Fig. 5-5-1.)

1. Removal

1) Remove the COMPL HEAD BRACKET special mounting nut ②.
2) Remove the SLEEVE ③, the COMPL HEAD BRACKET ① and the ACE HEAD SPRING COIL ④, in that order.

Note : Take care not to scratch or soil the ACE head surface.

2. Remounting

1) Apply grease to the axle ⑥ as shown in Fig. A.
2) Apply grease to the spot where the COMPL HEAD BRACKET ① makes contact with the STOPPER ⑦ (See Fig. A).
3) Mount the ACE HEAD SPRING COIL ④ and the COMPL HEAD BRACKET ①, in that order, onto the axle ⑥. Hook one end of the ACE HEAD SPRING COIL ④ to the notch ⑤, and the other end to the COMPL HEAD BRACKET, so that the COMPL HEAD BRACKET is pressed against the STOPPER ⑦ (See Fig. A).
4) Mount the SPECIAL NUT ② onto the axle ⑥ through the SLEEVE ③.
5) Clean the ACE head surface with a chamois leather moistened with methyl alcohol.
6) Perform ACE head adjustment as instructed in 6-4.

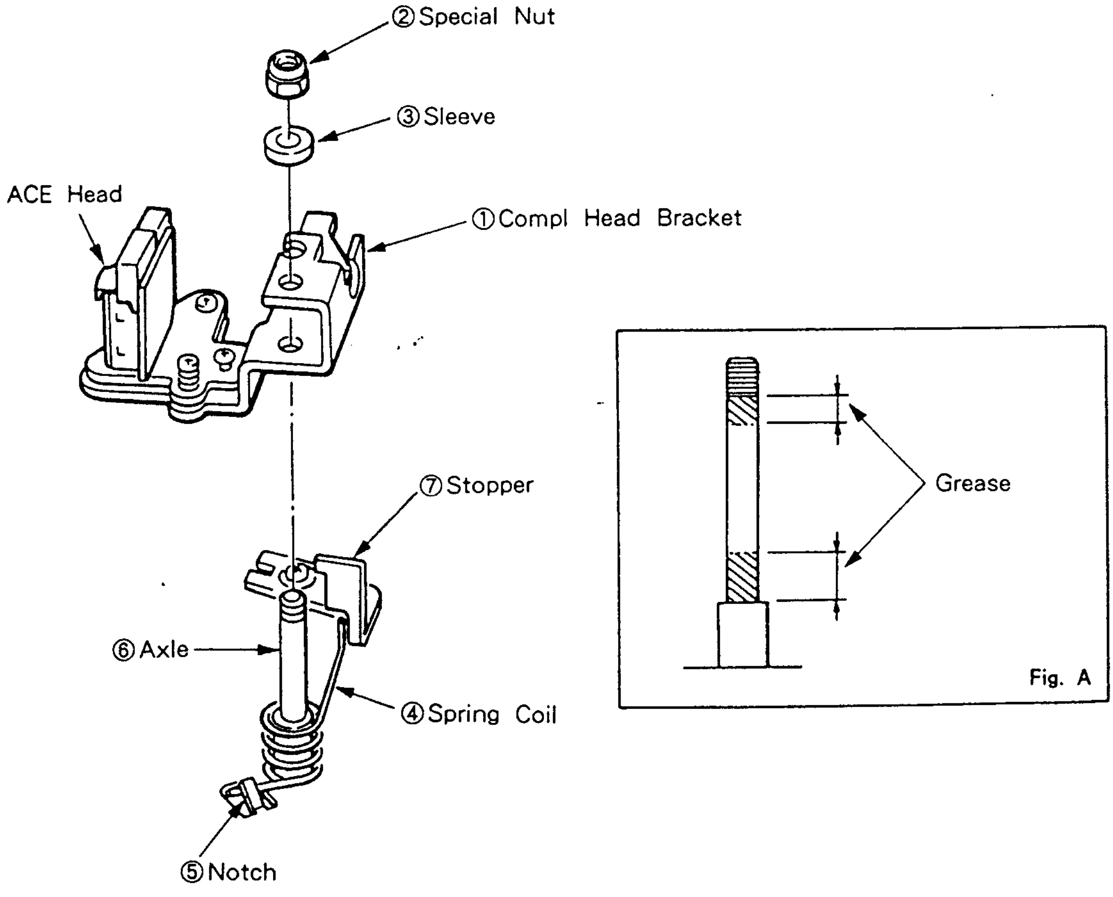

②Special Nut
③Sleeve
ACE Head
①Compl Head Bracket
⑦Stopper
⑥Axle
④Spring Coil
⑤Notch
Grease
Fig. A

Fig. 5-5-1. Compl Head Bracket (ACE Head)

5-6. PINCH ROLLER PRESSURE MECHANISM (See Fig. 5-6-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COMPL HEAD BRACKET as instructed in 5-5.
3) Remove the PINCH SPRING COIL ①.
4) Remove the special washer ②, then remove the PINCH LEVER ASS'Y ③.
5) Remove the REV GUIDE LEVER SPRING COIL ④.
6) Remove REV GUIDE LEVER ASS'Y ⑥ from the hook ⑤ of the plastic bearing on the bottom side. Use a jig VHJ-0073 shown in Fig. 5-6-2 to widen the hook of the plastic bearing. By so doing, the above removal of the REV GUIDE LEVER ASS'Y ⑥ can be made more easily. Care should be taken to avoid pushing the jig VHJ-0073 too much. Pushing it too hard may damage the hook in an extreme case.
7) Remove the SLIDE BRAKE SPRING COIL ⑦.
8) Remove the special washer ⑧, then remove the PINCH CAM LEVER ASS'Y ⑨.
9) Remove the ACT PINCH SLIDE ASS'Y ⑩.

Note: If the hook ⑤ of the plastic bearing is damaged, reference should be made to Section 3. "Method of Repairing the Bearing Section of REV GUIDE LEVER ASS'Y".

2. Remounting

1) Apply grease to pins ⑫/⑬ and axles ⑯/⑱.
2) Apply grease to the ACT PINCH SLIDE ASS'Y pin ⑰.
3) Set the INITIAL mode with the mode selector (VHJ-0050).
4) Mount the ACT PINCH SLIDE ASS'Y ⑩ onto pins ⑫ and ⑬.
5) Insert the pin ⑭ of the PINCH CAM LEVER ASS'Y ⑨ into the MAIN CAM ⑪ GROOVE 1, and mount onto the axle ⑯ while inserting the ACT PINCH SLIDE ASS'Y pin ⑰ of the ACT PINCH SLIDE ASS'Y into the hole ⑮.
6) Mount the special washer ⑧ onto the axle ⑯.
7) Hook the SLIDE BRAKE SPRING COIL ⑦ to the plastic pin ⑲.
8) Mount the REV GUIDE LEVER ASS'Y ⑥ to the plastic molding bearing, then fix it with the hook ⑤ at the bottom.
9) Hook the REV GUIDE LEVER SPRING COIL ④.
10) Mount the PINCH LEVER ASS'Y ③ to the axle ⑱.
11) Mount the special washer ② to the axle ⑱.
12) Hook the PINCH SPRING COIL ① between the ACT PINCH SLIDE ASS'Y ⑩ and the PINCH LEVER ASS'Y ③.
13) Mount the COMPL HEAD BRACKET as instructed in 5-5.
14) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
15) Perform ACE head adjustment as instructed in 6-4.

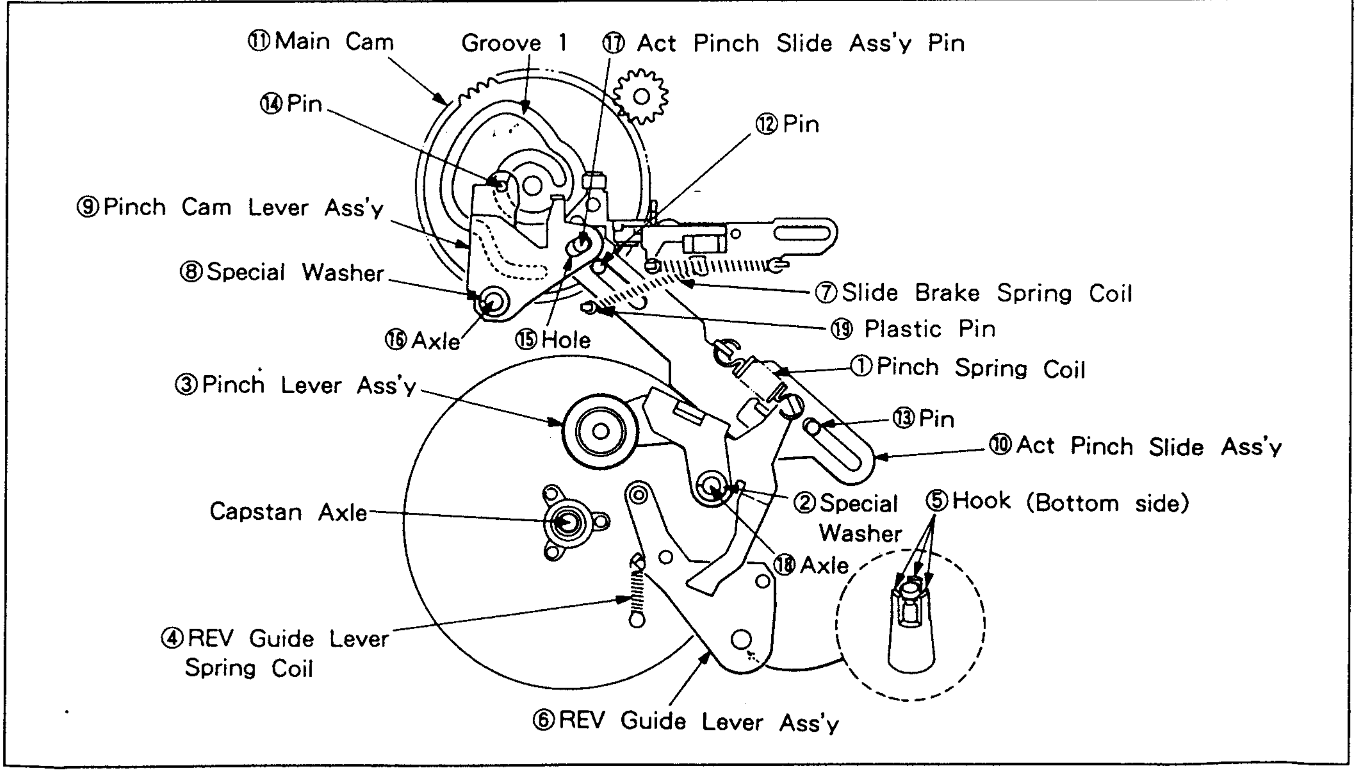
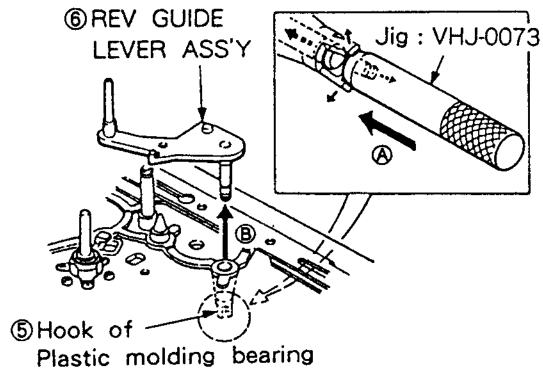

⑪Main Cam
Groove 1
⑰ Act Pinch Slide Ass'y Pin
⑭Pin
⑫Pin
⑨Pinch Cam Lever Ass'y
⑧Special Washer
⑦Slide Brake Spring Coil
⑲ Plastic Pin
⑯Axle
⑮Hole
①Pinch Spring Coil
③Pinch Lever Ass'y
⑬Pin
⑩Act Pinch Slide Ass'y
Capstan Axle
②Special Washer
⑤Hook (Bottom side)
⑱Axle
④REV Guide Lever Spring Coil
⑥REV Guide Lever Ass'y

Fig. 5-6-1. Pinch Roller Pressure Mechanism


⑥REV GUIDE
LEVER ASS'Y
Jig : VHJ-0073
Ⓐ
Ⓑ
⑤Hook of
Plastic molding bearing

Remove REV GUIDE LEVER ASS'Y in the direction of arrow Ⓑ, pushing VHJ-0073 slightly in the direction of arrow Ⓐ.
Be careful not to damage the hook by pushing too much.

Fig. 5-6-2 Method of Using the Jig VHJ-0073

3. Method of Repairing the Bearing Section of REV GUIDE LEVER ASSEMBLY

If the hook of the plastic molding bearing is damaged in the process of removing the REV GUIDE LEVER ASS'Y, proceed with the repair as follows :

1) Scrape the broken hook of the bearing section with a cutter knife and flatten it.
2) Insert the REV GUIDE LEVER ASS'Y in the bearing and fit a stopper washer in. The special washer to be used must be Part No. 411 109 1605. This stop washer (Part No. 411 109 1605) is the same as that used on SUPPLY REEL ASS'Y or TAKE-UP REEL ASS'Y.
   Remove the REV GUIDE LEVER ASSEMBLY toward an arrow B while pushing the jig VHJ-0073 lightly in the direction of an arrow.

Pushing the jig VHJ-0073 too much may cause hook breakage. Therefore, care should be taken.

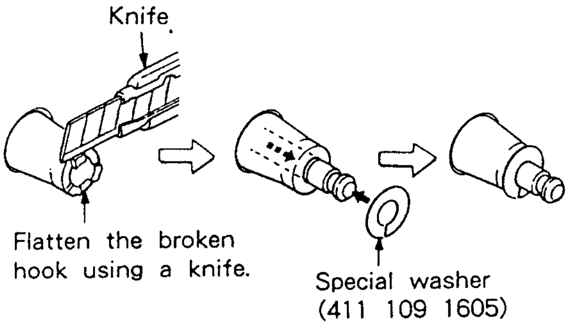

Knife
Flatten the broken
hook using a knife.
Special washer
(411 109 1605)

Fig. 5-6-3 Method of Repairing the Bearinlg Section of the REV GUIDE LEVER ASSEMBLYE

5-7. BRAKE MECHANISM

5-7-1. Sub Take-up Brake Ass'y (See Fig. 5-7-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) While pushing the hook ② in the direction of arrow, remove the SUB TAKE-UP BRAKE ASS'Y ③.

2. Remounting

1) Mount the SUB TAKE-UP BRAKE ASS'Y ③ onto the pin ④. Confirm that the hook ② is firmly hooked to the chassis.
2) Fit the SPRING COIL between hooks ⑤ and ⑥.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

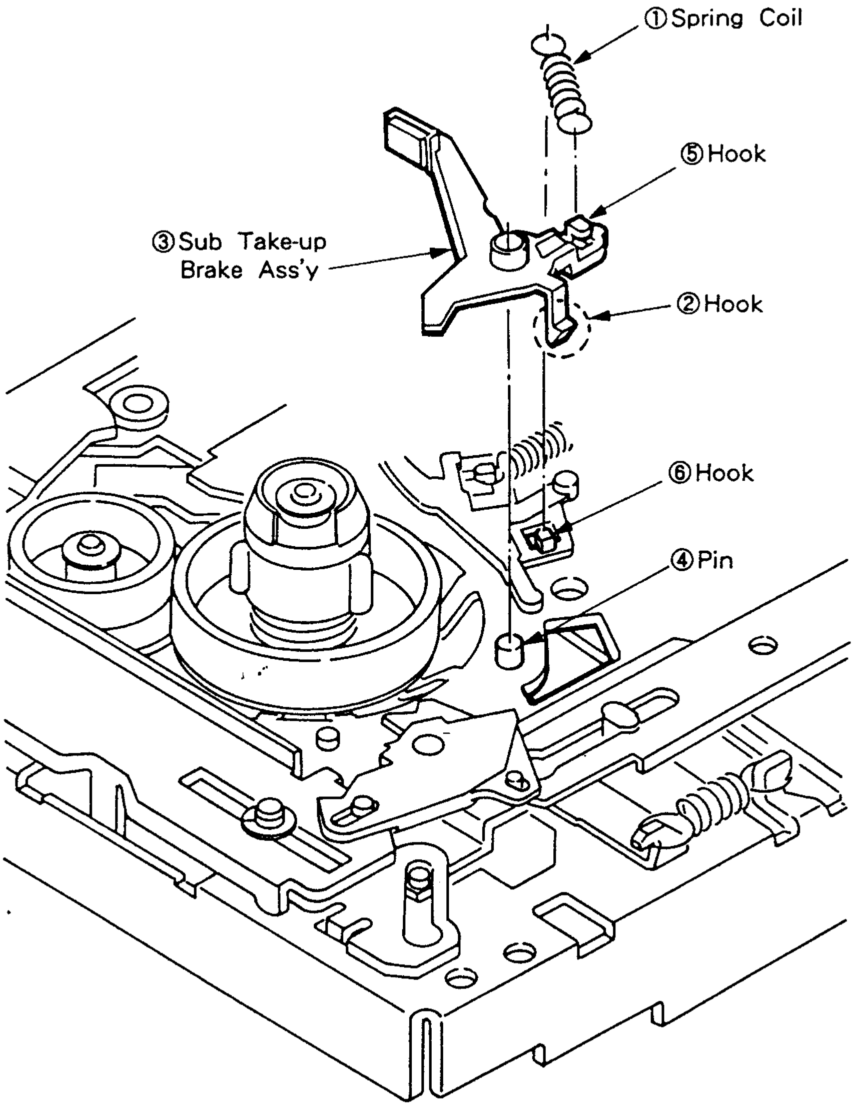

①Spring Coil
⑤Hook
③Sub Take-up Brake Ass'y
②Hook
⑥Hook
④Pin

Fig. 5-7-1. Sub Take-up Brake Ass'y

5-7-2. Supply Brake Ass'y and Take-up Brake Ass'y (See Fig. 5-7-2.)

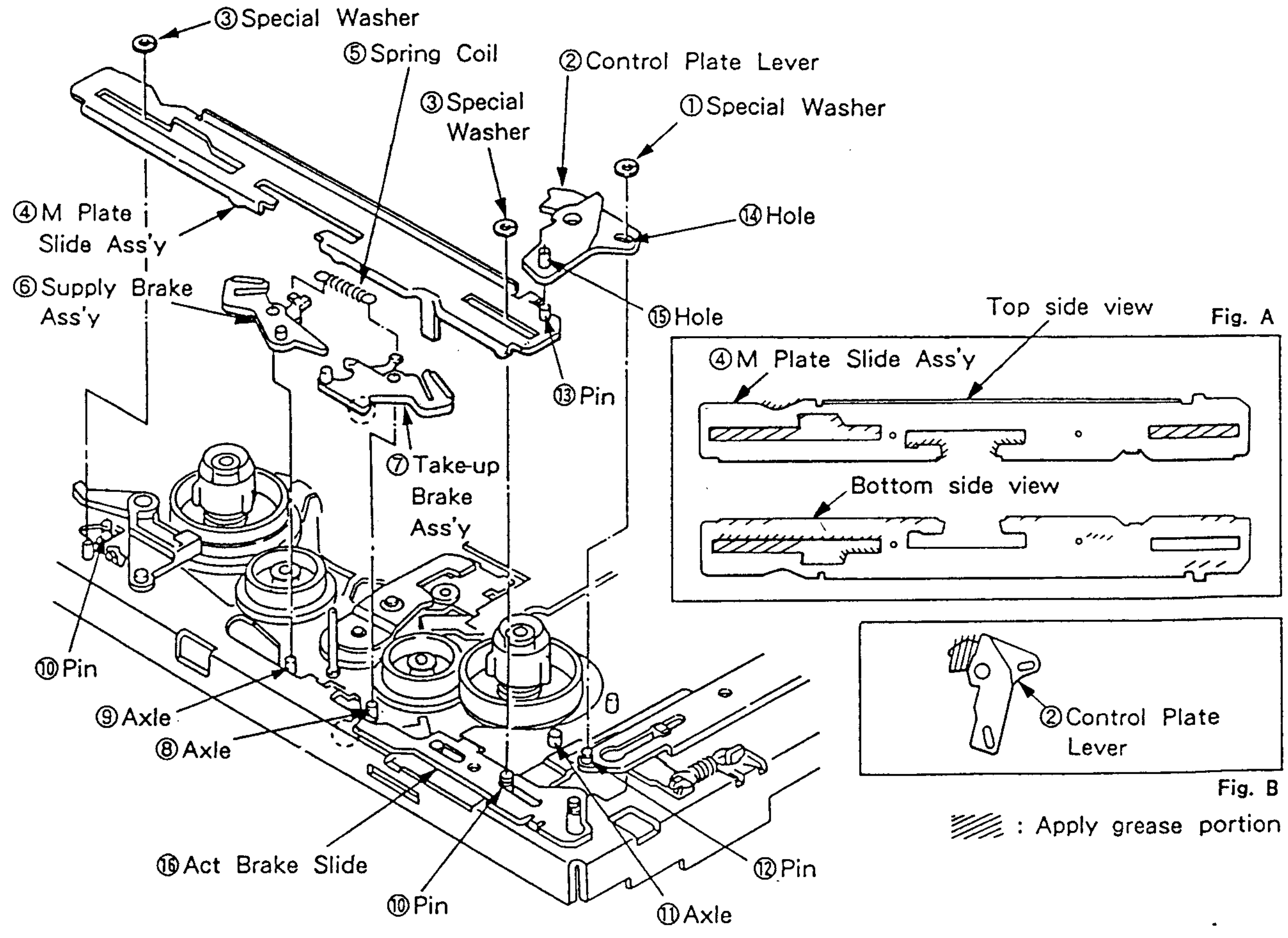
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SUB TAKE-UP BRAKE as instructed in 5-7-1.
3) Remove the special washer ①, then remove the CONTROL PLATE LEVER ②.
4) Remove the two special washers ③, then remove the M PLATE SLIDE ASS'Y ④.
5) Remove the SPRING COIL ⑤.
6) Remove the SUPPLY BRAKE ASS'Y ⑥ and the TAKE-UP BRAKE ASS'Y ⑦.

Note : Take care not to soil the brake shoes.

2. Remounting

1) Apply a thin layer of grease to axles ⑧ and ⑨.
2) Mount the TAKE-UP BRAKE ASS'Y ⑦ onto the axle ⑧.
3) Mount the SUPPLY BRAKE ASS'Y ⑥ onto the axle ⑨.
4) After applying a thin layer of grease to the M PLATE SLIDE ASS'Y ④ as shown in Fig. A, mount it onto the two pins ⑩.
5) Mount the two special washers ③ onto the two pins ⑩.
6) After applying grease to the CONTROL PLATE LEVER ② as shown in Fig. B, mount it onto the axle ⑪. Insert the ACT PLATE SLIDE ASS'Y pin ⑫ into the hole ⑭, and the M PLATE SLIDE ASS'Y pin ⑬ into the hole ⑮.
7) Mount the special washer ① onto the pin ⑫.
8) Mount the SUB TAKE-UP BRAKE as instructed in 5-7-1.
9) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.


③Special Washer
⑤Spring Coil
②Control Plate Lever
③Special Washer
①Special Washer
④M Plate Slide Ass'y
⑭Hole
⑥Supply Brake Ass'y
⑮Hole
⑬Pin
⑦Take-up Brake Ass'y
⑩Pin
⑨Axle
⑧Axle
⑯Act Brake Slide
⑩Pin
⑪Axle
⑫Pin
Top side view
Fig. A
④M Plate Slide Ass'y
Bottom side view
②Control Plate Lever
Fig. B
▨ : Apply grease portion

When assembling, the contact surfaces of Take-up Brake ⑦ and the Brake Slide ⑯ marked with ◌ should contact but not overlap each other.

Fig. 5-7-2. Supply Brake Ass'y & Take-up Brake Ass'y

5-7-3. Tension Lever Ass'y and Band Holder Ass'y (See Fig. 5-7-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) Remove the screw ③ fixing the BAND HOLDER ASS'Y ②.
4) Push the SUB SUPPLY BRAKE ④ in the direction of the arrow A, setting the BAND HOLDER ASS'Y ② free.
5) Open the hook ⑤ a little and remove the TENSION LEVER ASS'Y ⑥. Take care not to open the hook ⑤ too much, otherwise it may be deformed or broken.
6) Remove the hook ⑦ of the BAND HOLDER ASS'Y.

2. Remounting

1) Mount the BAND HOLDER ASS'Y hook ⑦ into the TENSION LEVER ASS'Y hole ⑧.
2) Insert the TENSION LEVER ASS'Y axle ⑨ into the hole ⑩ and confirm that the hook ⑤ is hooked.
3) While pushing the SUB SUPPLY BRAKE ④ in the direction of arrow A, mount the BAND HOLDER ASS'Y ② with the screw ③.
4) Hook the SPRING COIL ① between the hooks ⑪ and ⑫.
5) Perform TENSION POLE position adjustment as instructed in 6-3.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

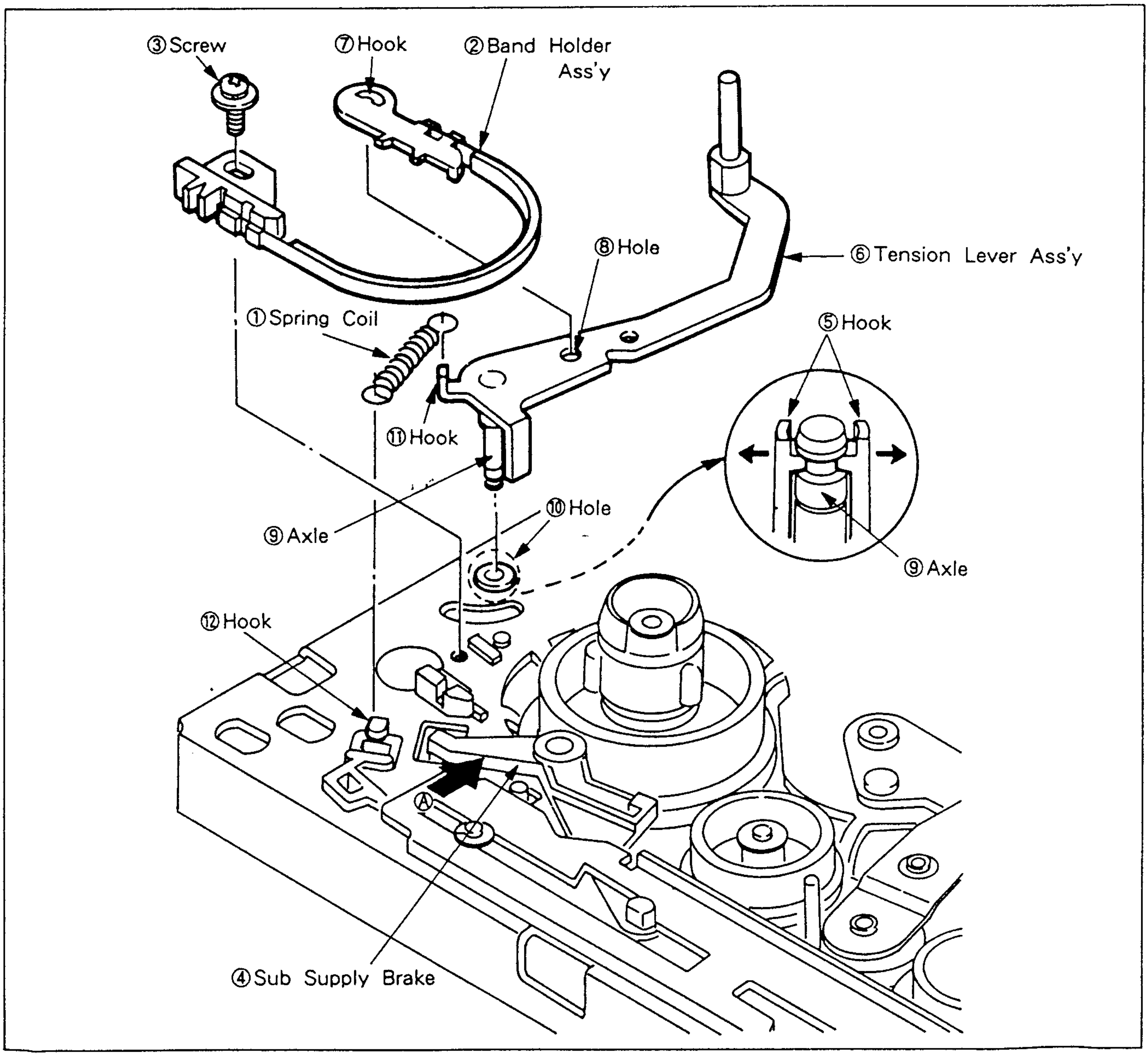

③Screw
⑦Hook
②Band Holder Ass'y
⑧Hole
⑥Tension Lever Ass'y
⑤Hook
①Spring Coil
⑪Hook
⑩Hole
⑨Axle
⑨Axle
⑫Hook
Ⓐ
④Sub Supply Brake

Fig. 5-7-3. Tension Lever Ass'y & Band Holder Ass'y

5-7-4. Capstan Brake Ass'y (See Fig. 5-7-4.)

1. Removal

1) Remove the SPRING COIL ①.
2) Unhook the hook ②, then remove the CAPSTAN BRAKE ASS'Y ③.

2. Remounting

1) Mount the CAPSTAN BRAKE ASS'Y ③ onto the axle ④. Confirm that the hook ② is hooked to the chassis.
2) Hook the SPRING COIL ① between hooks ⑤ and ⑥. Fix the hook ⑥ side with adhesive (use an adhesive that allows later detaching).

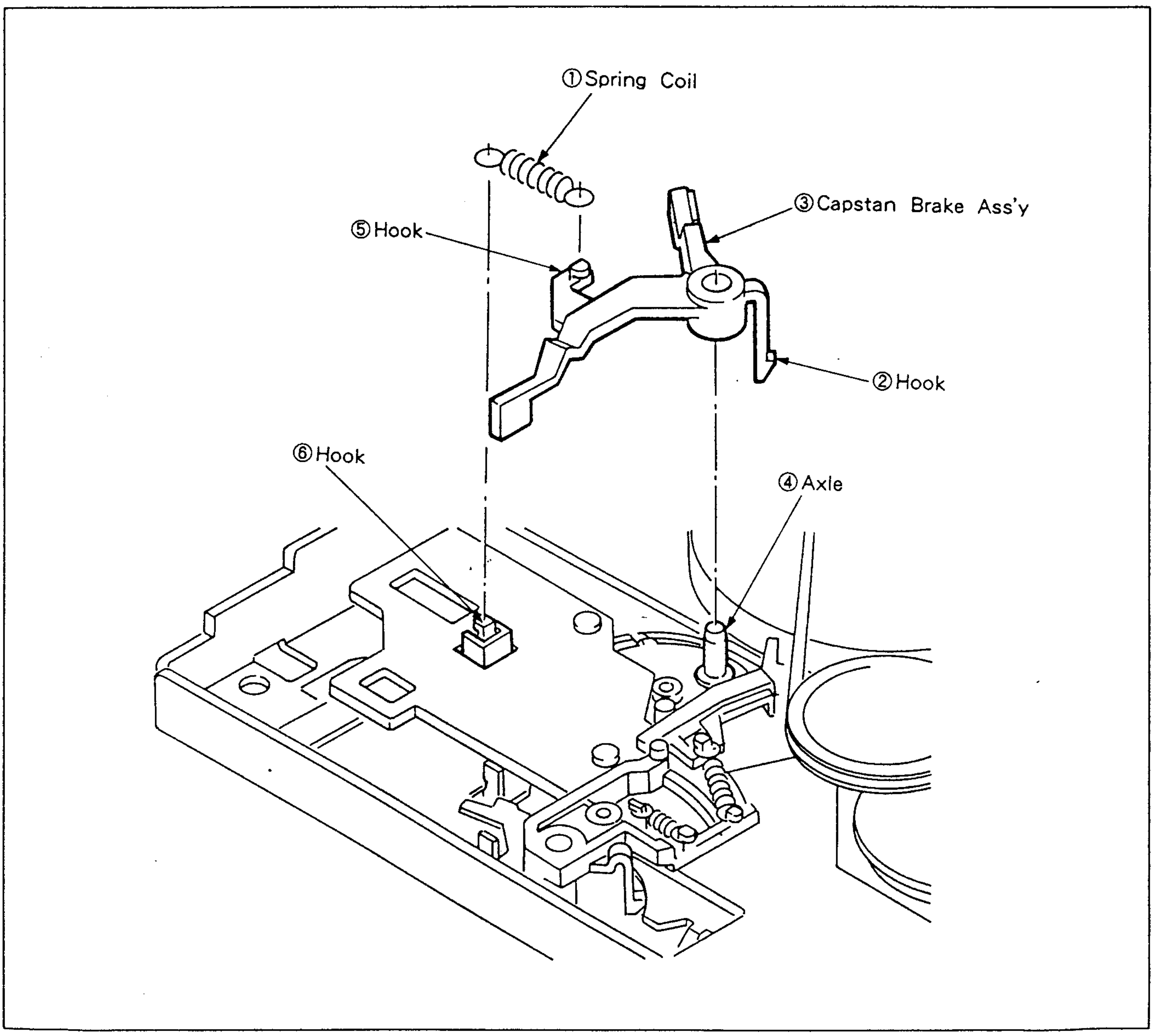

①Spring Coil
③Capstan Brake Ass'y
⑤Hook
②Hook
⑥Hook
④Axle

Fig. 5-7-4. Capstan Brake Ass'y

5-8. REEL TABLE DRIVE MECHANISM

5-8-1. Supply Reel Ass'y and Supply Reel Gear (See Fig. 5-8-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the BAND HOLDER ASS'Y as instructed in 5-7-3.
3) Set the PLAY mode with the mode selector (VHJ-0050).
4) Remove the special washer ①, then remove the SUPPLY REEL ASS'Y ② and the washer ③.
5) Remove the special washer ④.
6) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, remove the SUPPLY REEL GEAR ⑥ and the washer ⑦.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑧ indicated by the arrow B, then mount the washer ⑦.
2) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, mount the SUPPLY REEL GEAR ⑥ onto the axle ⑧.
3) Mount the special washer ④ to the axle ⑧.
4) Apply 1 drop of oil to the part of the axle ⑨ indicated by the arrow C, then mount the washer ③.
5) Mount the SUPPLY REEL ASS'Y ② onto the axle ⑨.
6) Perform reel table height adjustment as instructed in 6-2-1.
7) Mount the special washer ① onto the axle ⑨.
8) Mount the BAND HOLDER ASS'Y as instructed in 5-7-3.
9) Perform tension pole position adjustment as instructed in 6-3.
10) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

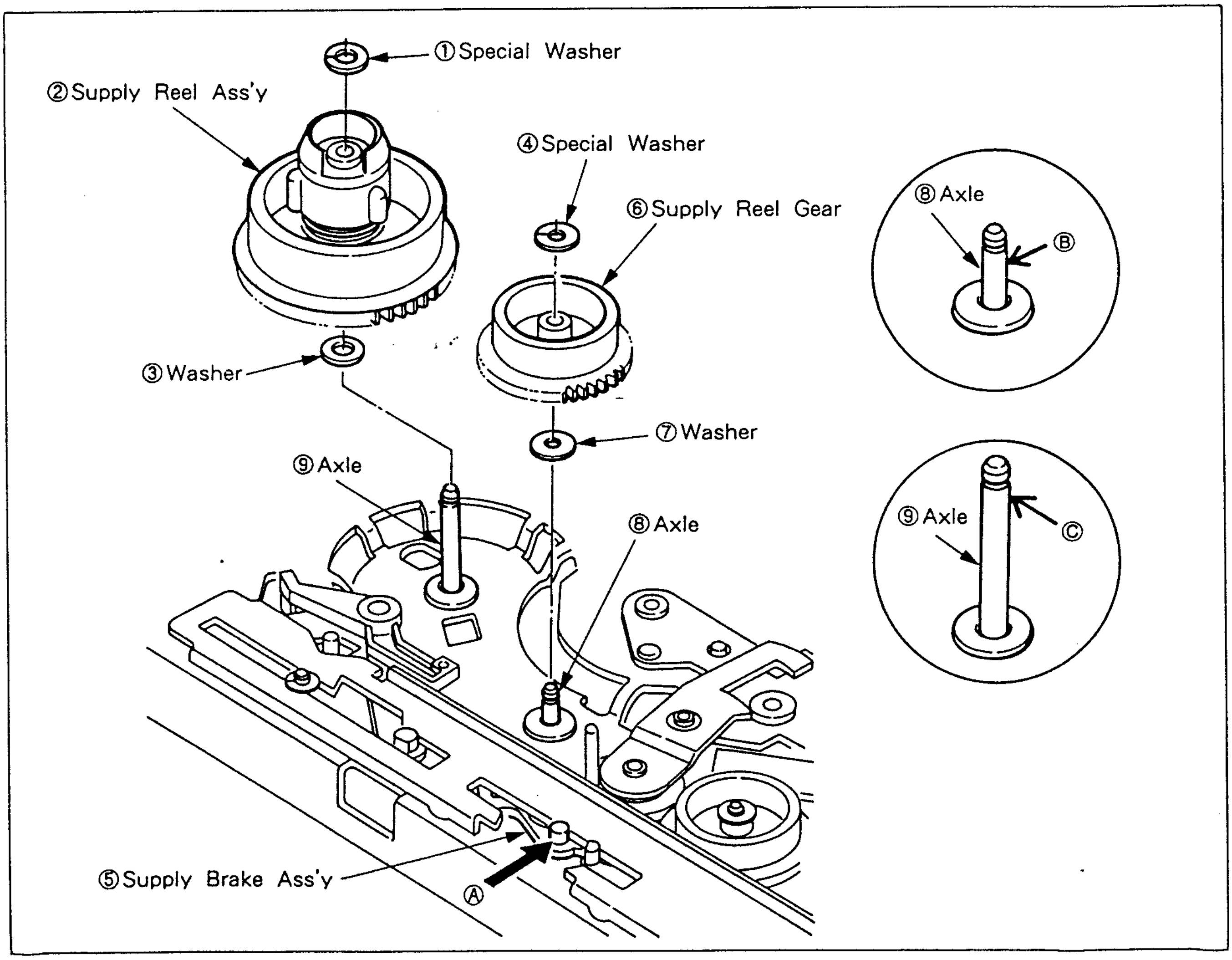


Fig. 5-8-1. Supply Reel Ass'y & Supply Reel Gear

5-8-2. Take-up Reel Ass'y (See Fig. 5-8-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the special washer ①.
3) Push the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A to release the brake, then remove the TAKE-UP REEL ASS'Y ③ and the washer ④.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply 1 drop of oil to the part of the axle ⑤ indicated by the arrow B, then mount the washer ④.
2) While pushing the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A, mount the TAKE-UP REEL ASS'Y ③ onto the axle ⑤.
3) Perform reel table height adjustment as instructed in 6-2.
4) Mount the special washer ① onto the axle ⑤.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

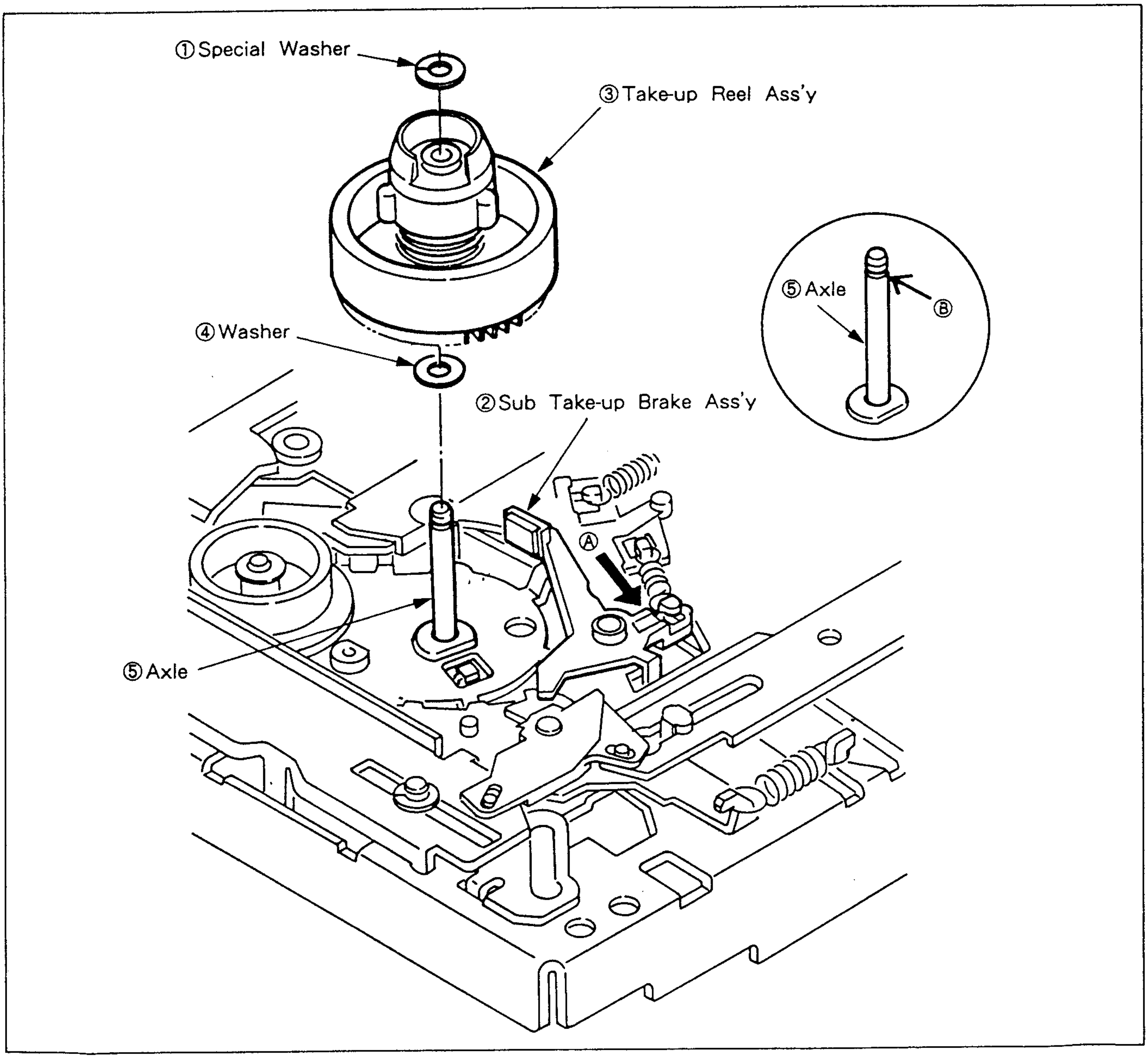


Fig. 5-8-2. Take-up Reel Ass'y

5-8-3. Take-up Reel Gear (See Fig. 5-8-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
3) Remove the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
4) Remove the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Remove the special washer ①, then remove the TAKE-UP REEL GEAR ③ and the washer ④.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑤ indicated with an arrow.
2) Mount the washer ④ and the TAKE-UP REEL GEAR ③ onto the axle ⑤.
3) Mount the special washer ① onto the axle ⑤.
4) Mount the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Mount the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
6) Mount the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
7) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

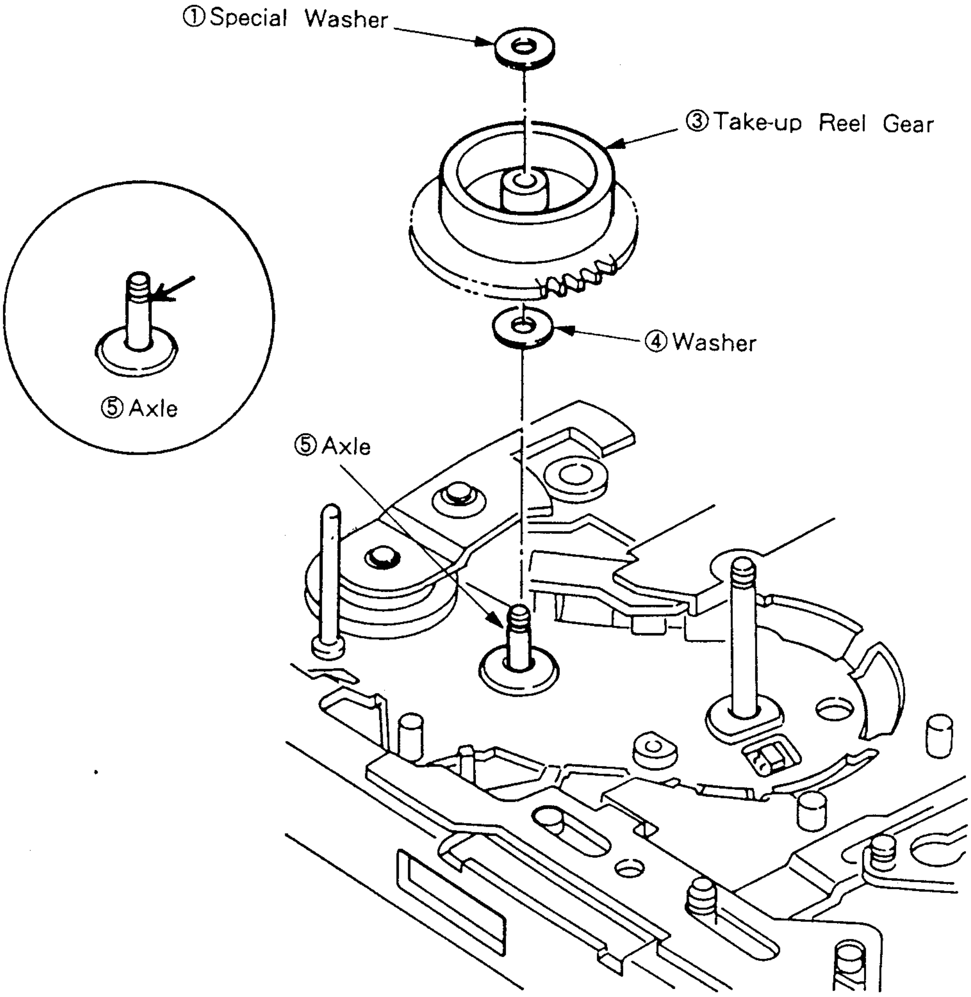


Fig. 5-8-3. TaKe-up Reel Gear

5-8-4. Reel Pulley and Friction Gear Ass'y (See Fig. 5-8-4.)

1. Removal

1) Remove the REEL DRIVE BELT ③.
2) Remove the special washer ④, then remove the REEL PULLEY ⑤.
3) Remove the special washer ⑥, then remove the FRICTION GEAR ASS'Y ⑦ and the washer ⑧.

2. Remounting

1) Apply one drop of oil to the parts of axles ⑨ and ⑩ indicated with arrows.
2) Mount the washer ⑧ and the FRICTION GEAR ASS'Y ⑦ onto the axle ⑨.
3) Mount the special washer ⑥ onto the axle ⑨.
4) Mount the REEL PULLEY ⑤ onto the axle ⑩.
5) Mount the special washer ④ onto the axle ⑩.
6) Set the REEL DRIVE BELT ③.

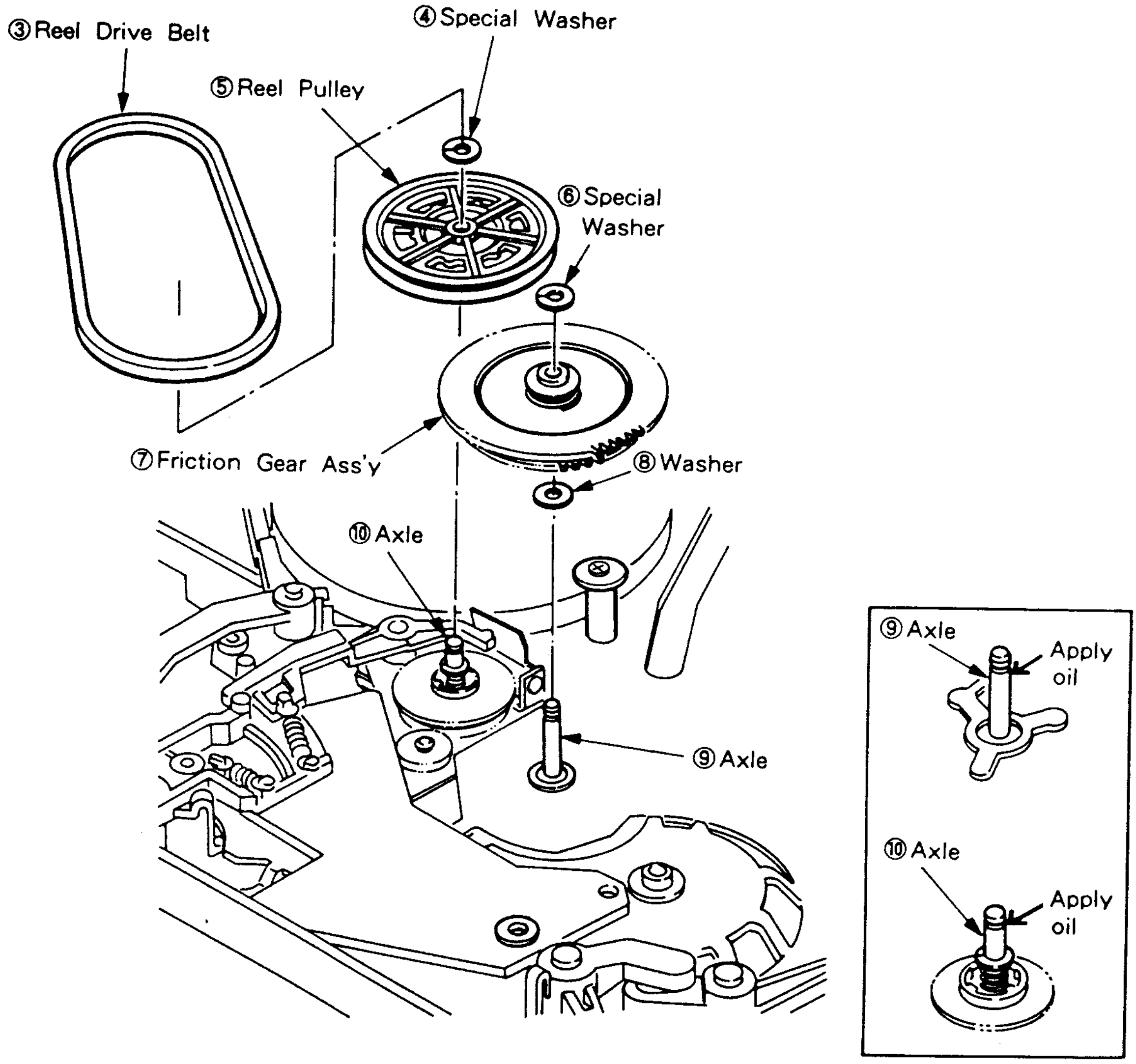

③Reel Drive Belt
④Special Washer
⑤Reel Pulley
⑥Special Washer
⑦Friction Gear Ass'y
⑧Washer
⑩Axle
⑨Axle
⑨Axle
Apply oil
⑩Axle
Apply oil

Fig. 5-8-4. Reel Pulley & Friction Gear

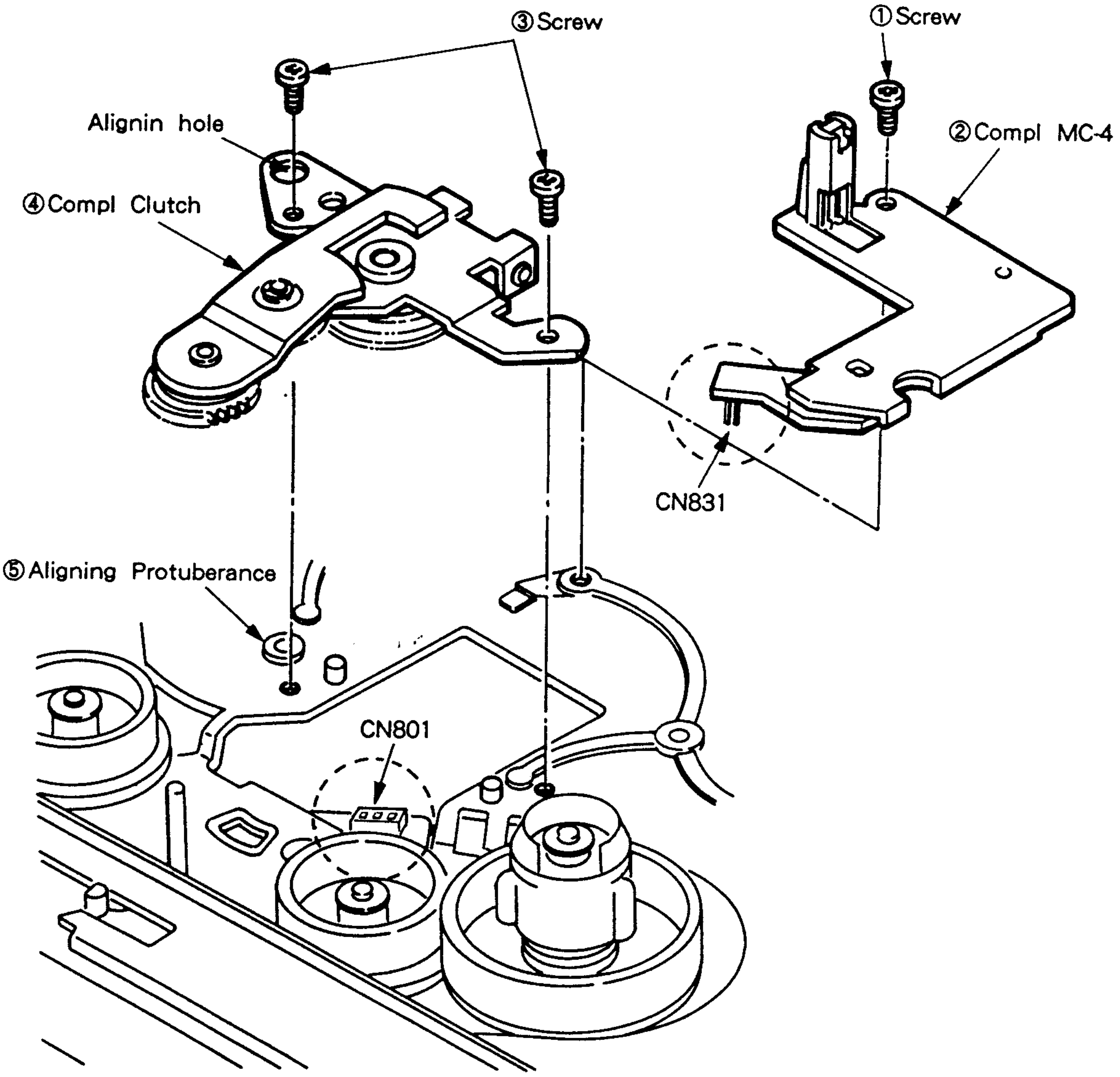
5-8-5. COMPL Clutch (See Fig. 5-8-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the screw ①, then remove the COMPL MC-4 ②.
4) Remove the two screws ③, then remove the COMPL CLUTCH ④.

2. Remounting

1) Mount the COMPL CLUTCH ④ with the two screws ③, aligning it with the protuberance ⑤.
2) After inserting the CN831 (COMPL MC-4) into the CN801 (COMPL MC-1), mount the COMPL MC-4 with the screw ①.
3) Mount the REEL PULLEY and REEL DRIVE BELT as instructed in 5-8-4.
4) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.


③Screw
①Screw
Alignin hole
②Compl MC-4
④Compl Clutch
CN831
⑤Aligning Protuberance
CN801

Note: The form of CN801 and CN831 differ from the P90 mechanism.

Fig. 5-8-5. Compl Clutch

5-8-6. Clutch Change Lever and Clutch Lever Ass'y (See Fig. 5-8-6.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the SPRING COIL ①.
4) Unhook the hook ②, then remove the CLUTCH CHANGE LEVER ③.
5) Unhook the hook ⑤, then remove the CLUTCH LEVER ASS'Y ⑥.

2. Remounting

1) Mount the CLUTCH LEVER ASS'Y ⑥ onto the axle ⑦. Confirm that the hook ⑤ is hooked to the chassis.
2) Mount the CLUTCH CHANGE LEVER ③ onto the axle ⑧. Confirm that the hook ② is hooked to the chassis.
3) Hook the SPRING COIL ① between the hooks ⑨ and ⑩.
4) Mount the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

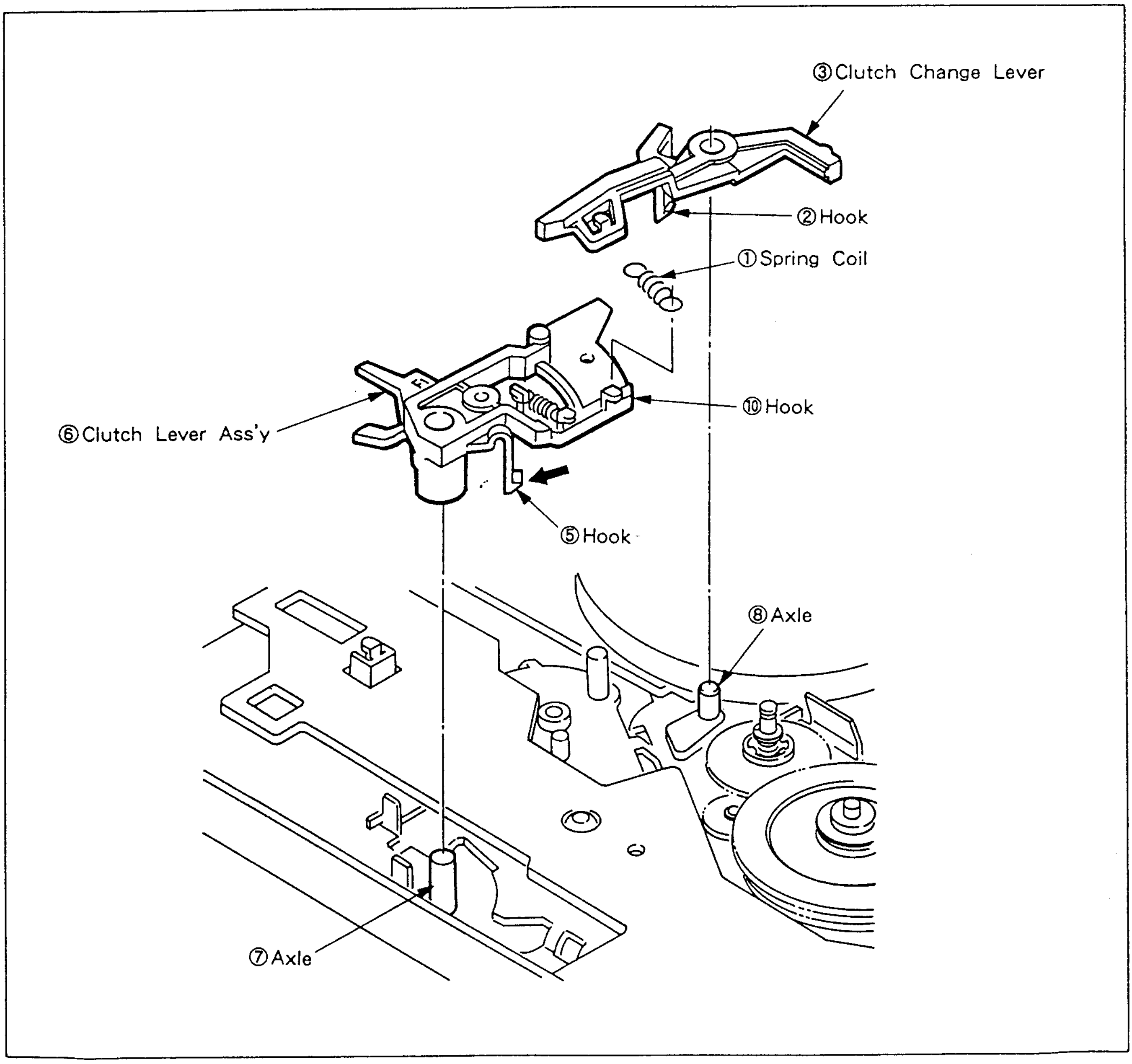


Fig. 5-8-6. Clutch Change Lever & Clutch Lever Ass'y

5-9. CAPSTAN MOTOR (See Fig. 5-9-1.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the CAPSTAN MOTOR ⑥ connector.
3) Remove the REEL DRIVE BELT ② from the CAPSTAN MOTOR PULLEY ①.
4) Remove the two screws ④ fixing the COMPL CASSETTE MECHANISM TOP BOARD ③, then slide the TOP BOARD ③ backward.
5) Remove the three screws ⑤, then remove the CAPSTAN MOTOR ⑥.

Note : Take care not to scratch or soil the capstan axle.

2. Remounting

1) Mount the CAPSTAN MOTOR ⑥ with the three screws ⑤.
2) Connect the CAPSTAN MOTOR ⑥ connector.
3) Mount the TOP BOARD ③ with the two screws ④.
4) Fit the REEL DRIVE BELT ② around the CAPSTAN MOTOR PULLEY ① and the REEL PULLEY ⑦.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

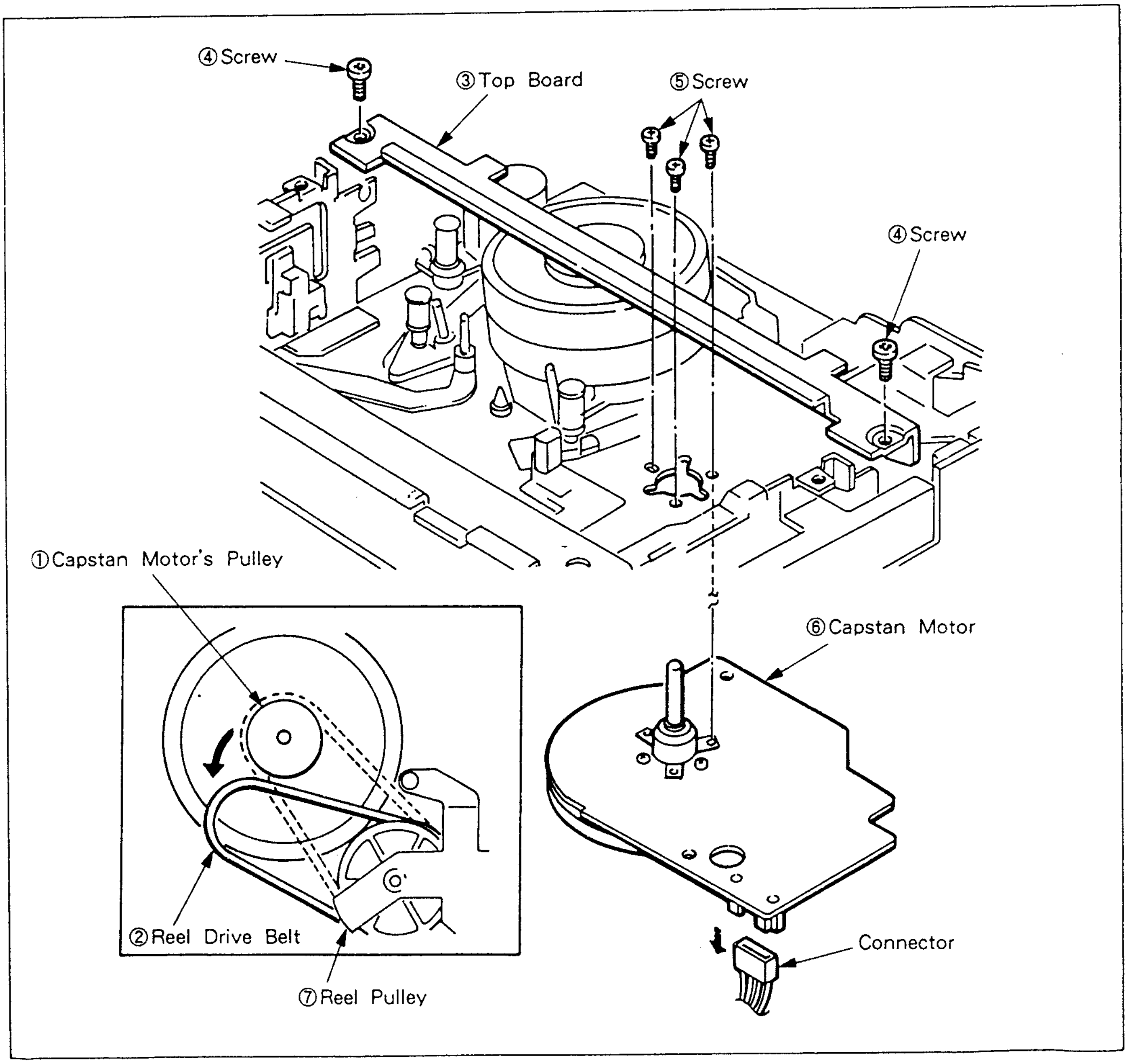

④Screw
③Top Board
⑤Screw
④Screw
①Capstan Motor's Pulley
⑥Capstan Motor
②Reel Drive Belt
⑦Reel Pulley
Connector

Fig. 5-9-1. Capstan Motor

5-10. FIXED GUIDE, FE HEAD LEVER ASS'Y

5-10-1. S-Side Fixed Guide and FE Lever Ass'y (See Fig. 5-10-1.)

1. Removal

1) Remove the special nut ①, then remove the GUIDE PIPE ③ and the special washer ② (lower), in that order.
2) Remove the SPRING COIL ⑤.
3) Remove the FTE HEAD connector, then remove the FE HEAD LEVER ASS'Y ⑦.

2. Remounting

1) Mount the FE LEVER ASS'Y ⑦ onto the axle ⑧.
2) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE LEVER ASS'Y hook ⑩.
3) Mount the special washer ② (lower), the GUIDE pipe ③ and the special nut ① to the axle ⑧, in that order. At that time, do not excessively tighten the special nut ① to avoid idle rotation of the axle rivet. The height of fixing guide on the inlet side is not required.
4) Connect the connector to the FTE HEAD.

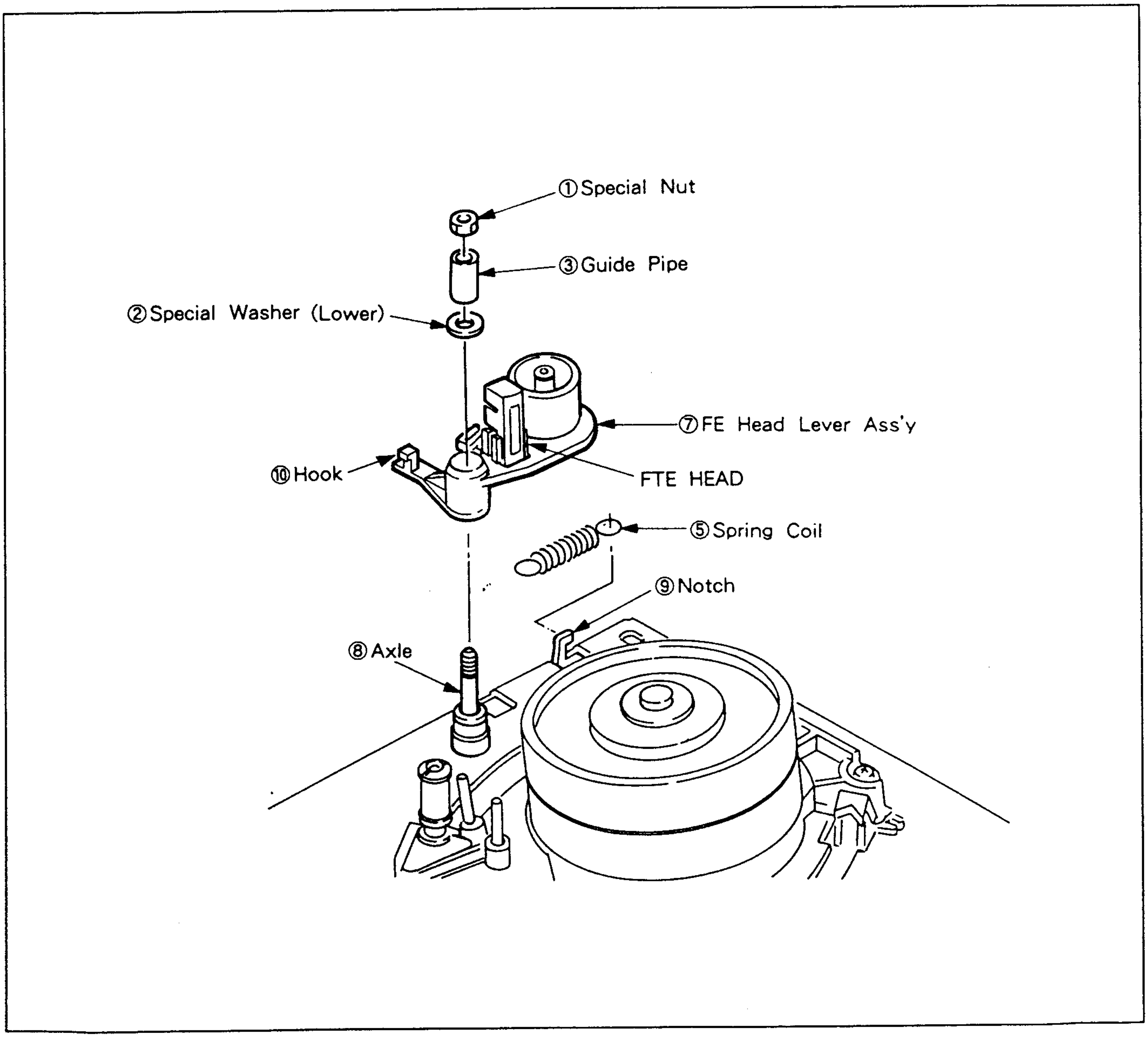

①Special Nut
③Guide Pipe
②Special Washer (Lower)
⑦FE Head Lever Ass'y
⑩Hook
FTE HEAD
⑤Spring Coil
⑨Notch
⑧Axle

Fig. 5-10-1. Fixed Guide (S) & FE Lever Ass'y

5-10-2. Impedance Roller, FTE Head (See Fig. 5-10-2.)

1. Removal

1) Remove the FTE HEAD (full track erase head) ① connector.
2) Remove the special washer ②, then remove the IMPEDANCE ROLLER ③ and the washer ④.
3) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note : Take care not to open the hook too much, otherwise it may be deformed or broken.

2. Remounting

1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
2) Mount the washer ④ and the IMPEDANCE ROLLER ③, in that order, onto the axle ⑦, then mount the special washer ②.
3) Connect the connector to the terminal of the FTE HEAD ①.

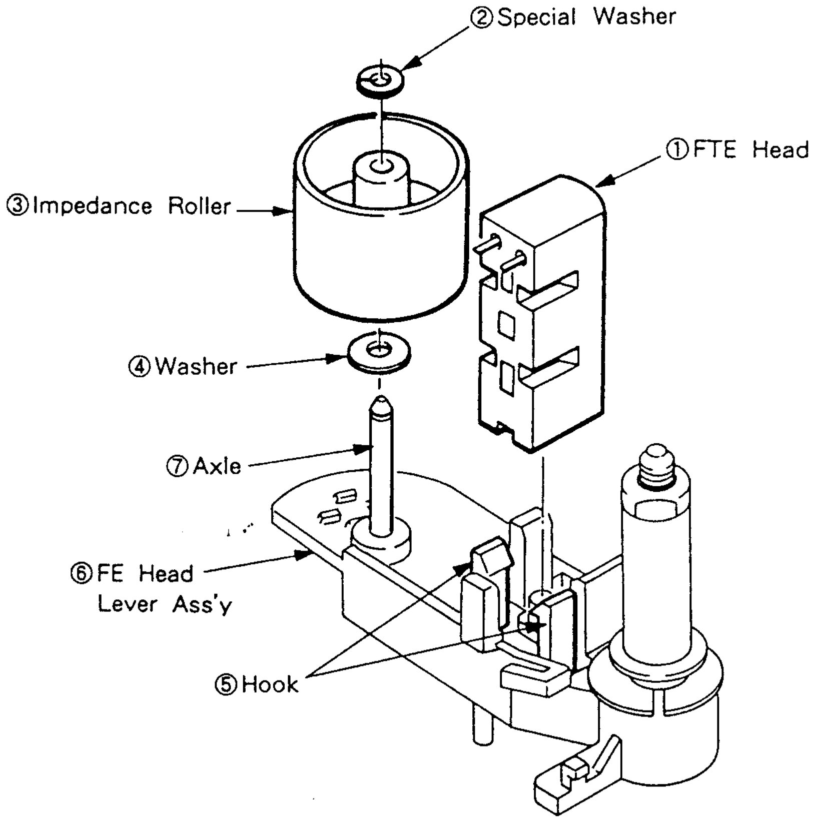

②Special Washer
①FTE Head
③Impedance Roller
④Washer
⑦Axle
⑥FE Head Lever Ass'y
⑤Hook

Fig. 5-10-2. Impedance Roller & FTE Head

5-10-3. Exit side Fixed Guide (See Fig. 5-10-3.)

1. Removal

1) Remove the CAP ①.
2) Remove the special NUT ②, then remove the special washer ③ (upper), the GUIDE PIPE ④, the special washer ③ (lower) and the sleeve ⑤, in that order.

2. Remounting

1) Mount the sleeve ⑤, the special washer ③ (lower), the GUIDE PIPE ④, the special washer ③ (upper) and the special NUT ②, in that order, to the axle ⑥.
2) Mount the CAP ① onto the axle ⑥.

Note: There is no need of height adjustment of the exit side fixed guide.

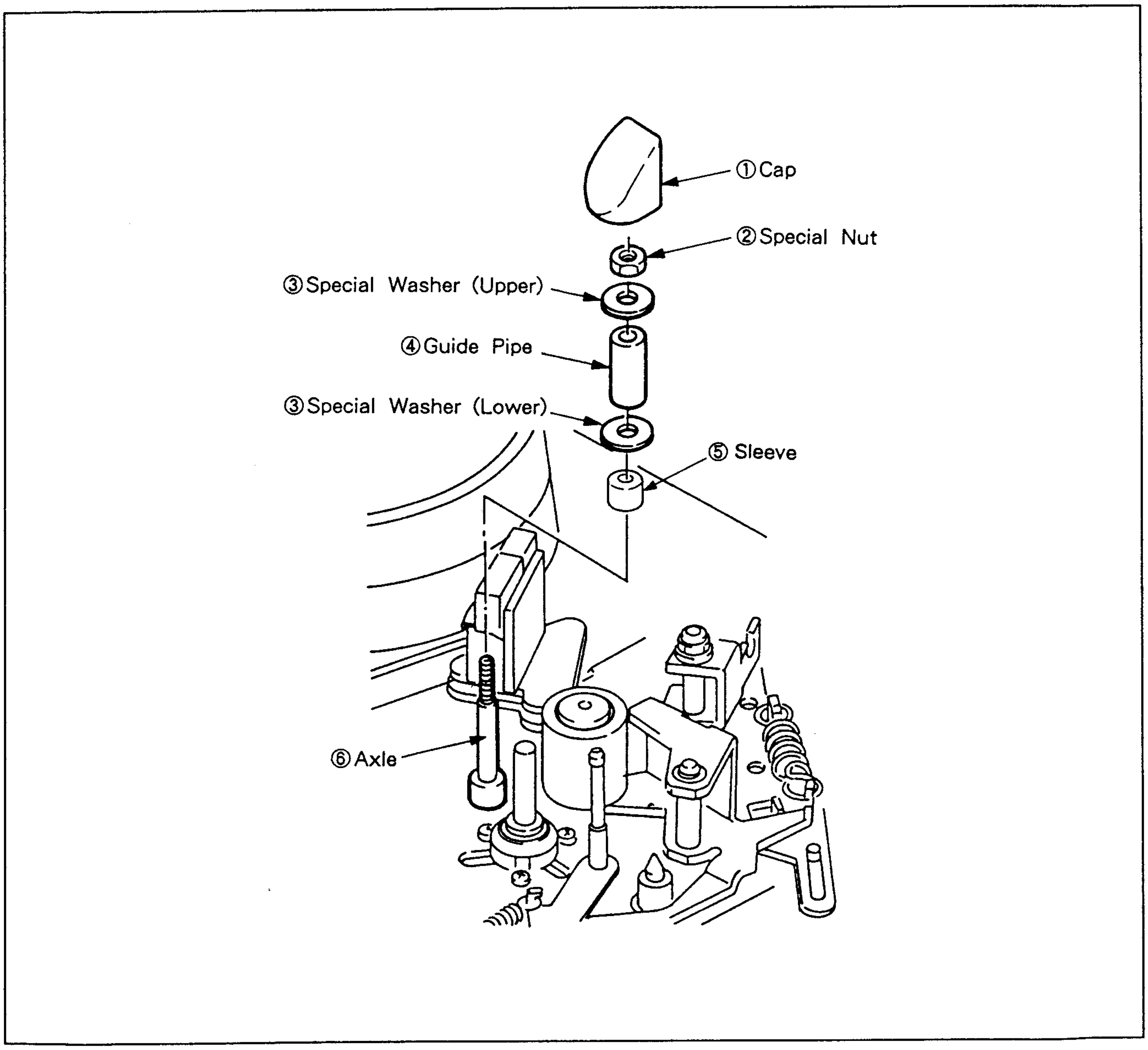

①Cap
②Special Nut
③Special Washer (Upper)
④Guide Pipe
③Special Washer (Lower)
⑤ Sleeve
⑥Axle

Fig. 5-10-3. Fixed Guide (T)

5-11. DRUM SECTION

5-11-1. Drum Motor (rotor, stator) (See Fig. 5-11-1.)

1. Removal

1) Remove the screw ①, then remove the CYLINDER EARTH ASS'Y ②.
2) Remove the two screws ③, then remove the ROTOR ④ and SPACER.
3) Remove the STATOR board connector ⑩.
4) Remove the three screws ⑤, then remove the STATOR ⑥.

2. Remounting

1) Mount the STATOR ⑥ with the three screws ⑤.
2) Mount the SPACER ⑪ on to the AXLE ⑫.
3) While aligning the ROTOR oval hole ⑦ with the ROTOR DISK hole ⑧, mount the ROTOR with the two screws ③.
4) Insert the connector ⑩.
5) While aligning the CYLINDER EARTH ASS'Y ② protuberance with the chassis hole ⑨, mount it with the screw ①.

Note 1 : Use a torque driver (VHJ-0014) for mounting the STATOR ⑥ and the ROTOR ④. Set fastening torque to 3kg-cm.

Note 2 : When the drum unit has been replaced, perform a tape path adjustment as instructed in 6-4. and perform a CH-1/CH-2 switching position adjustment of the servo circuit.

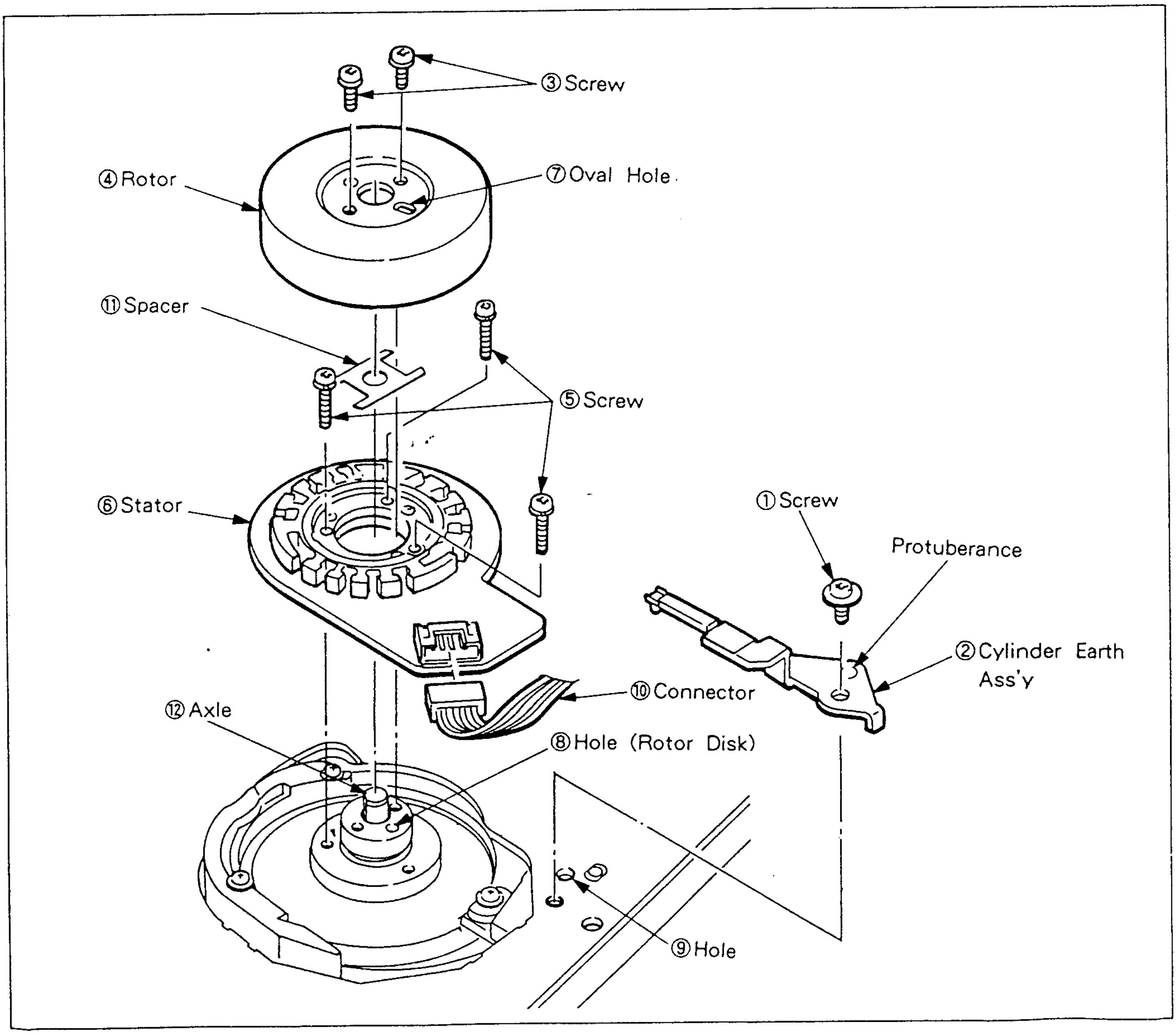

③Screw
④Rotor
⑦Oval Hole
⑪Spacer
⑤Screw
⑥Stator
①Screw
Protuberance
②Cylinder Earth Ass'y
⑩Connector
⑫Axle
⑧Hole (Rotor Disk)
⑨Hole

Fig. 5-11-1. Drum Motor

5-11-2. Drum Unit (See Fig. 5-11-2.)

1. **Removal**

1) For some models with the board located above the upper drum, remove the board.
2) Remove the flexible P.C.B. ① from the PRE-AMP UNIT (take care not to pull the flexible P.C.B. in the upward direction).
3) Remove the LOAD RACK only, as instructed in 5-4-1.
4) Remove the three screws ②, then remove the drum unit ③.

NOTE : When removing and remounting the drum unit, handle it carefully to protect it from scratches and dirt.

2. **Remounting**

1) While aligning the drum unit ③ to the protuberance, mount it to the drum base (CYLINDER BASE) ⑤ with the three screws ②.
2) Mount the ROAD RACK as instructed in 5-4-1.
3) Insert the flexible P.C.B. into the PRE-AMP UNIT.
4) Clean the drum unit.
5) Perform the tape path adjustment as instructed in 6-4. and perform the CH-1/CH-2 switching position adjustment of the servo circuit.

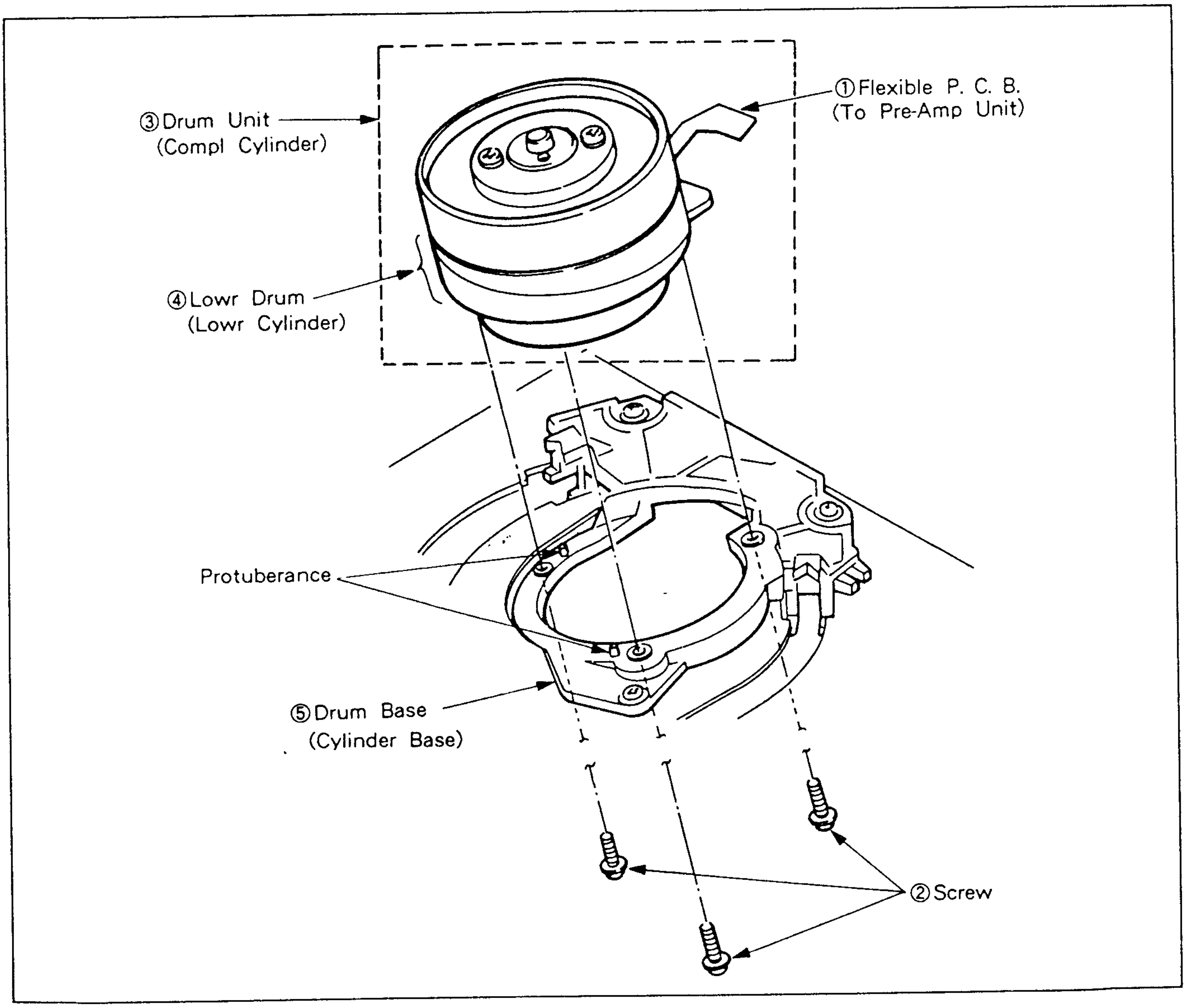

③Drum Unit
(Compl Cylinder)
①Flexible P. C. B.
(To Pre-Amp Unit)
④Lowr Drum
(Lowr Cylinder)
Protuberance
⑤Drum Base
(Cylinder Base)
②Screw

Fig. 5-11-2 Drum Unit (Compl Cylinder)

5-11-3. Upper Drum (Upper Cylinder)

1. Removal

1) Remove the two screws ① (see Fig. 5-11-3).
2) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum (UPPER CYLINDER), remove the lead wires soldered from the P.C. board (see Fig. 5-11-4.).
3) Turn the head removing jig (VHJ-0041) handle ② counterclockwise to lift up the stopper ③ (see Fig. 5-11-5.).
4) Insert the two long screws ④ of the jig into the screw holes ⑥ located on the head chip side of the upper drum (UPPER CYLINDER) ⑤, then mount by turning the handle clockwise.
5) While holding the jig so that the upper drum ⑤ does not rotate, turn the handle ② clockwise to remove the upper drum.
6) Remove the jig from the upper drum.

Note : Handle parts carefully to protect the drum from scratches and dirt, and the video head from damage.

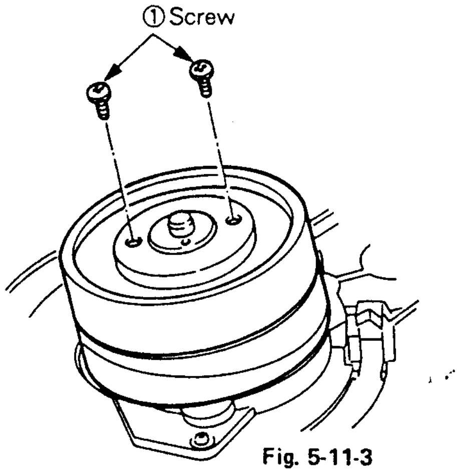


Fig. 5-11-3

Lead wires of Rotary Erase Head (Model for flying erase capability)

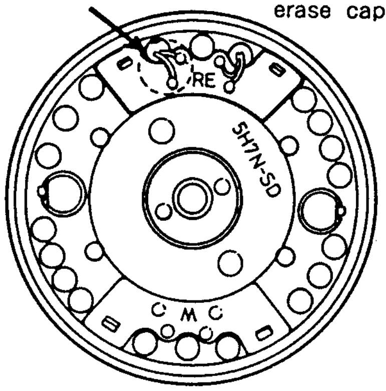

RE
SH7N-SD
C M C

Fig. 5-11-4

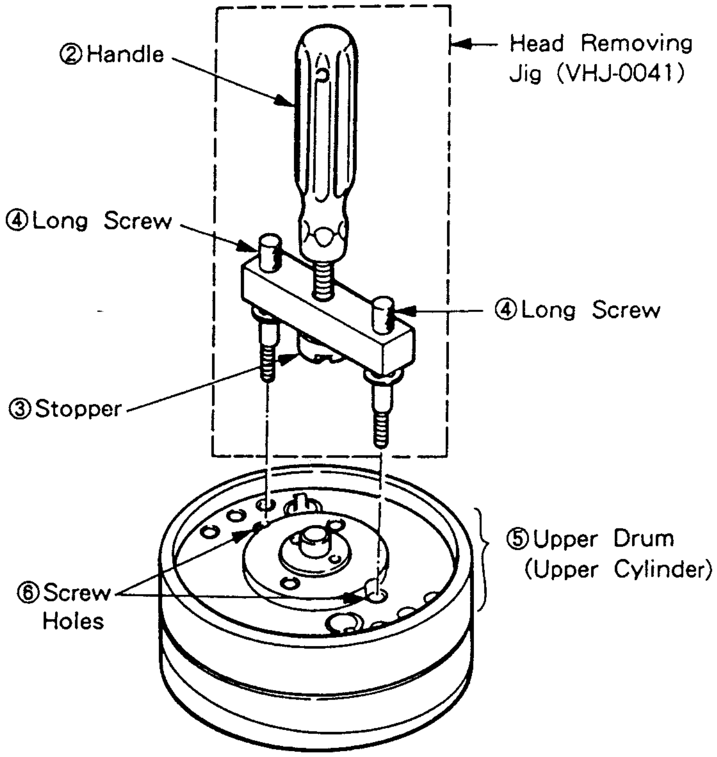

②Handle
Head Removing Jig (VHJ-0041)
④Long Screw
④Long Screw
③Stopper
⑤Upper Drum (Upper Cylinder)
⑥Screw Holes

Fig. 5-11-5

Upper Drum (Upper Cylinder)

2. Remounting (See Fig. 5-11-6.)

1) Confirm that surfaces where the flywheel and the upper drum (UPPER CYLINDER) are engaged or make contact portion are free from scratches and dirt.
2) The code name ① of the drum is printed on the video head side of the upper drum ⑤ SP CH-1 (channel A, plus azimuth). The code name ① is set with in the rotary transformer terminal round hole side ② position of lower drum (LOWER CYLINDER), so that the two screw holes ③ of the upper drum are aligned with the two screw holes ④ of the flywheel. (Refer to 3. Recognizing the SP CH-1 Head side).
3) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum, pass the lead wires through the lead wire hole. (See Fig.5-11-4.)
4) While keeping the upper drum ⑤ parallel to the lower drum (LOWER CYLINDER) ⑧, insert it completely into the flywheel.
5) Temporarily tighten the two screws ⑦ alternately a little at a time, then tighten them to a torque of 6kg-cm using a torque driver (VHJ-0014) and a 3mm bit (VHJ-0045).
6) In case the RE head is attached to the upper drum ⑤, solder the lead wires to the P.C. board. Solder the red lead wire to the R terminal, and the yellow lead wire to the Y terminal.

Note : When the upper drum has been replaced, perform a tape path adjustment as instructed in 6-4. and CH-1/CH-2 switching position adjustment of the servo circuit.

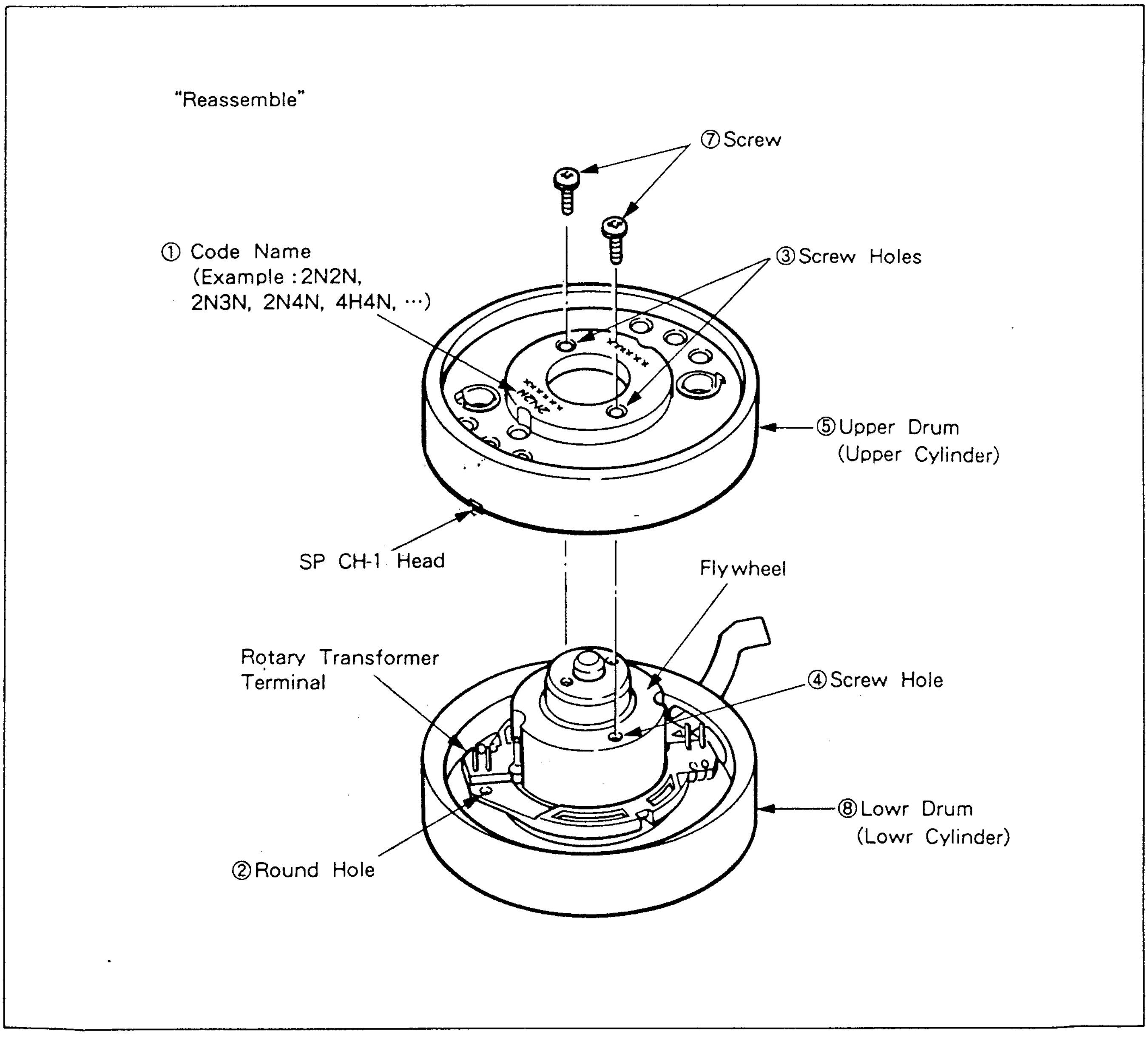
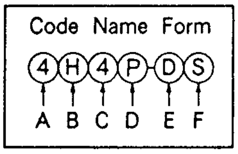

"Reassemble"
⑦Screw
① Code Name
(Example : 2N2N,
2N3N, 2N4N, 4H4N, …)
③Screw Holes
⑤Upper Drum
(Upper Cylinder)
SP CH-1 Head
Flywheel
Rotary Transformer
Terminal
④Screw Hole
⑧Lowr Drum
(Lowr Cylinder)
②Round Hole

Fig. 5-11-6.

3. **Recognizing the SP CH-1 Head Side**
No playback picture can be obtained if the video head is not wired as a pair with the rotary transformer located inside the lower drum rotating section. Therefore, mounting position should be matched when mounting the upper drum. In the P90 mechanism series, the code name of the drum is printed on the SP CH-1 (CH-A, plus azimuth) side as a mark for mounting the upper drum. (See Fig. 5-11-7.) This code name differs according to the drum type, but its basic form is as follows :


Code Name Form
④Ⓗ④Ⓟ-ⒹⓈ
A B C D E F

A = Number of head bases
B = "N" for normal audio
"H" for HI-FI audio
C = Number of heads
D = TV system ("N" or "P")
EF = Code for detailed classification. Depending on drum type, it can also be just one character, or a blank space.

Examples of Detailed Classification Codes
V = Head with level difference
D = Compatible with digital units
S = SVHS-compatible

Examples of Code Names
2N2P, 2N2P-L, 2N2P-V, 2N2P-D, 2N3P, 2N4P, 4H4P, 4H4P-D

Moreover, there is a round hole with marking purposes on the SP CH-1 (CH-A, plus azimuth) side of the lower drum rotary transformer terminal. As shown in Fig. 5-11-8, there are two types of rotary transformer terminals (the number of pins differs according to the number of heads).

Note : When ordering parts such as drums (CYLINDERS), do not use the code names ; always refer to the parts list and order with the specified part numbers.

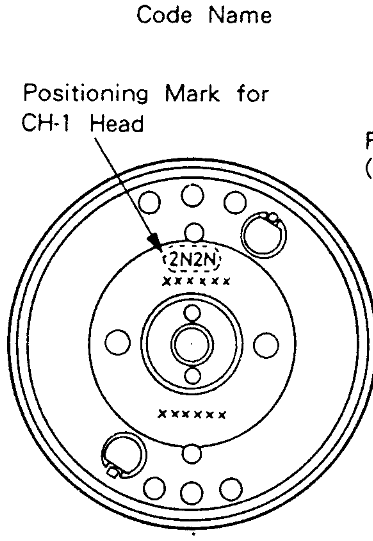

Code Name
Positioning Mark for CH-1 Head
2N2N
xxxxxx
xxxxxx

Fig. 5-11-7. Upper Drum

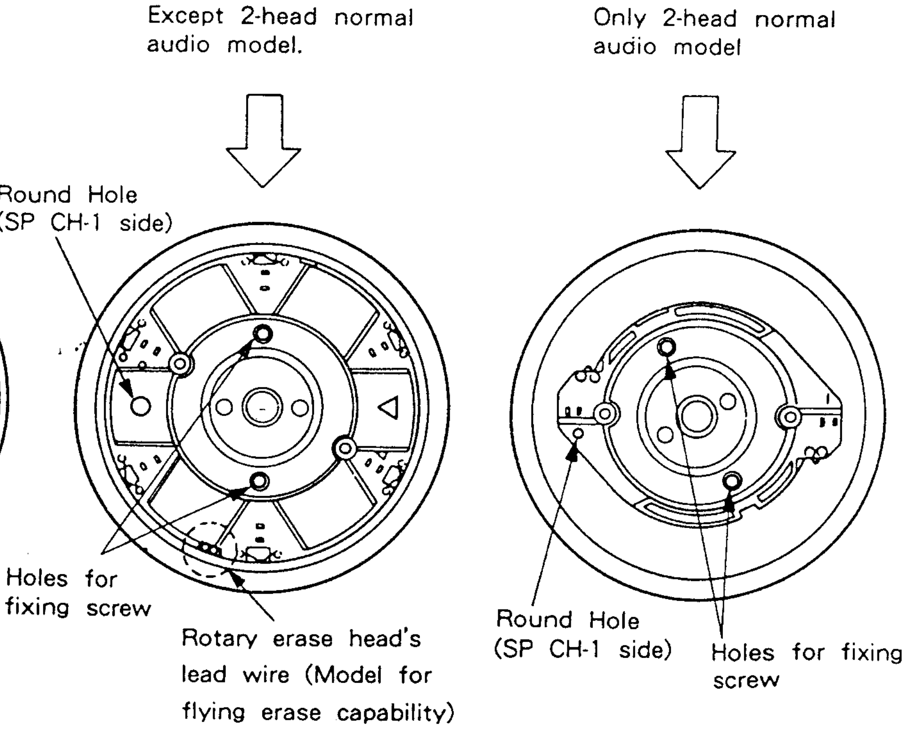
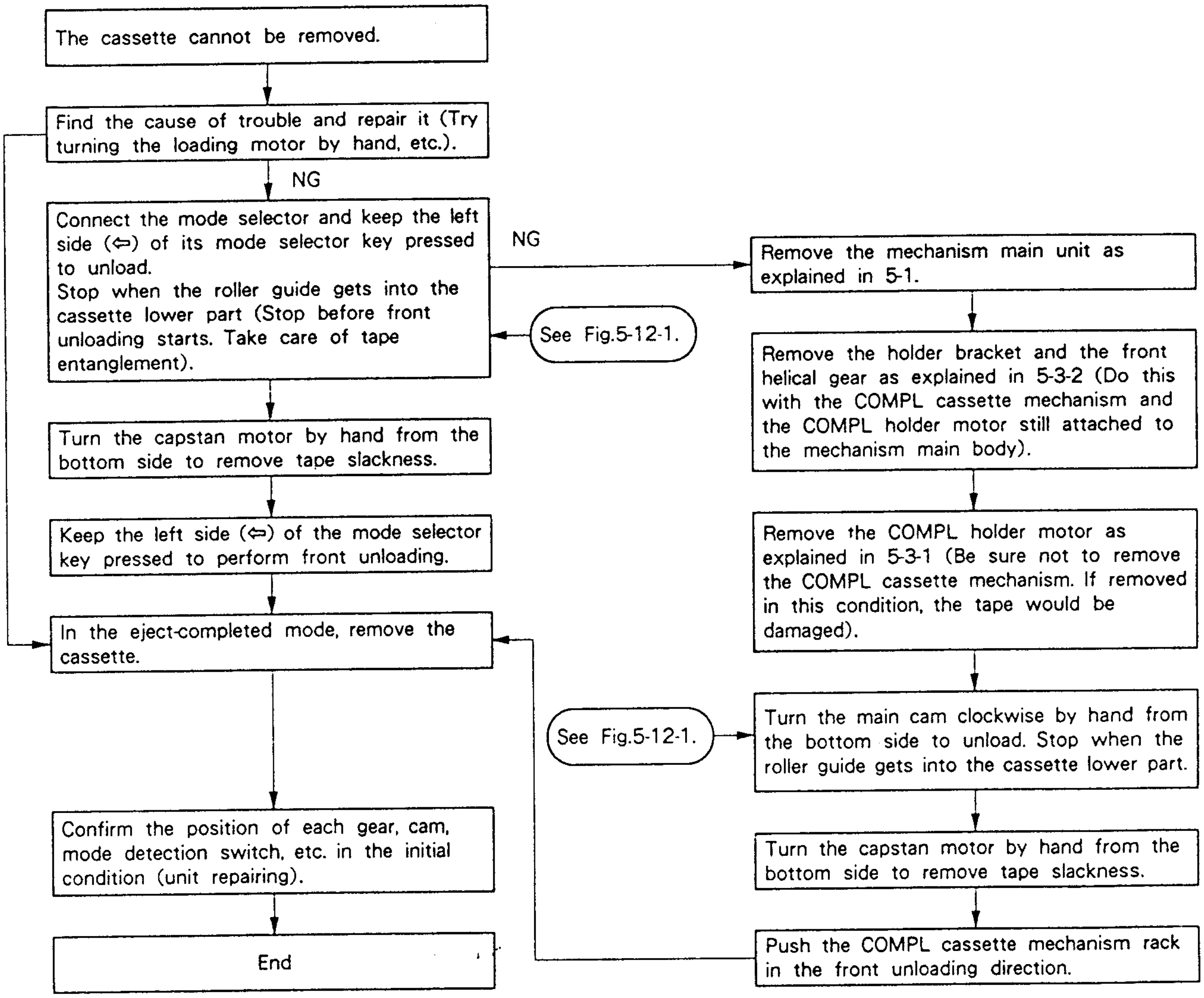

Except 2-head normal audio model.
Only 2-head normal audio model
Round Hole (SP CH-1 side)
Holes for fixing screw
Rotary erase head's lead wire (Model for flying erase capability)
Round Hole (SP CH-1 side)
Holes for fixing screw

Fig. 5-11-8. Lower Drum

5-12. HOW TO PROCEED WHEN THE CASSETTE CANNOT BE REMOVED



The cassette cannot be removed.

Find the cause of trouble and repair it (Try turning the loading motor by hand, etc.).

NG

Connect the mode selector and keep the left side (⇦) of its mode selector key pressed to unload.
Stop when the roller guide gets into the cassette lower part (Stop before front unloading starts. Take care of tape entanglement).

See Fig.5-12-1.

Turn the capstan motor by hand from the bottom side to remove tape slackness.

Keep the left side (⇦) of the mode selector key pressed to perform front unloading.

In the eject-completed mode, remove the cassette.

Confirm the position of each gear, cam, mode detection switch, etc. in the initial condition (unit repairing).

End

NG

Remove the mechanism main unit as explained in 5-1.

Remove the holder bracket and the front helical gear as explained in 5-3-2 (Do this with the COMPL cassette mechanism and the COMPL holder motor still attached to the mechanism main body).

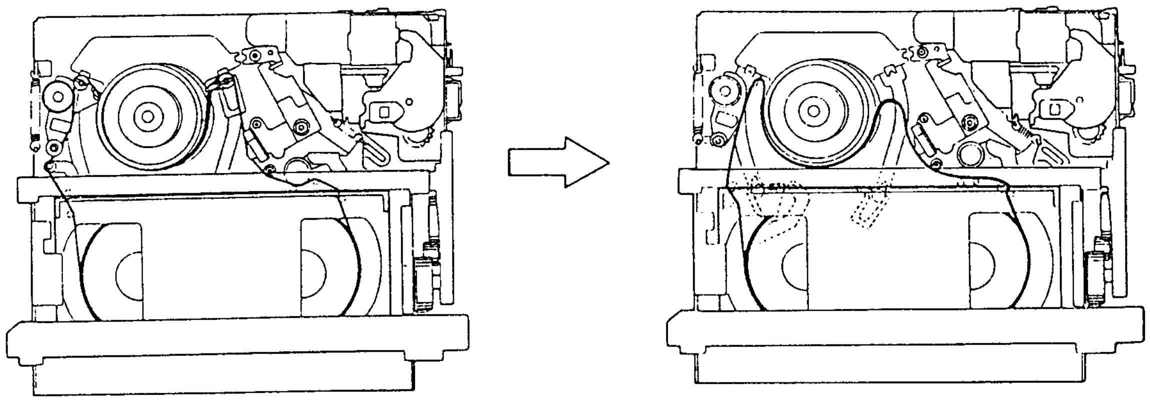
Remove the COMPL holder motor as explained in 5-3-1 (Be sure not to remove the COMPL cassette mechanism. If removed in this condition, the tape would be damaged).

See Fig.5-12-1.

Turn the main cam clockwise by hand from the bottom side to unload. Stop when the roller guide gets into the cassette lower part.

Turn the capstan motor by hand from the bottom side to remove tape slackness.

Push the COMPL cassette mechanism rack in the front unloading direction.



Before unloading

After unloading

Perform unloading using the mode selector.

First rotate the capstan motor by hand from the bottom to take-up the tape slack, and perform front-unloading using the mode selector.

Fig. 5-12-1

5-13. AUTO HEAD CLEANER MECHANISM (See. Fig. 5-13-1 • Fig. 5-13-2 • Fig. 5-13-3)

1. Removal

Note:
- Do not hold the ROLLER CLEANER ASS'Y ① by bare hand. Use tweezers and gloves not soiled with grease or dust, etc.
- When the cleaning function deteriorates and replacing only ROLLER CLEANER ASS'Y ①, there is no need to perform item 4).

1) Make sure that the ROLLER CLEANER ASS'Y ① is not pressed against a drum (cylinder).
2) Remove the PRE-AMP UNIT and the PRE-AMP BRACKET.
3) Remove screw ②, then lift up and remove the BRACKET CLEANER ASS'Y ③.
4) With the BRACKET CLEANER ASS'Y ③ is fixed by finger, turn the LEVER CLEANER ASS'Y ④ 35° to 40° to clockwise, then lift up and remove.
5) Remove the stop washer ⑤, then remove the ROLLER CLEANER ASS'Y ①.

2. Remounting

1) Mount the ROLLER CLEANER ASS'Y ① and the stop washer ⑤ to the axle ⑥ of LEVER CLEANER ASS'Y.
   Mount the ROLLER CLEANER ASS'Y ① so that the mark shown in Fig. 5-13-2 is up side. If the mark is down side, noise may occur.
2) Mount the SPRING COIL ⑧ and the LEVER CLEANER ASS'Y ④ to the axle ⑦ of BRACKET CLEANER ASS'Y. At this time, hook the SPRING COIL ⑧ to the hole ⑨ of the LEVER CLEANER ASS'Y and the bent part ⑩ of the BRACKET CLEANER ASS'Y. "A part" of the LEVER CLEANER ASS'Y should be under "B part" of the BRACKET CLEANER ASS'Y.
3) Fix the BRACKET CLEANER ASS'Y ③ on screw hole ⑫ by screw ②. Before fasten screw ②, insert hole ⑪ of the BRACKET CLEANER ASS'Y to axle ⑯, axle ⑦ to hole ⑬ to match positions. Pin ⑭ of the LEVER CLEANER ASS'Y should be run along the circumference of the MAIN CAM ⑮ not to be came off.
4) The upper side of the lower drum should be within approx. 2mm from the lower side of the ROLLER CLEANER ASS'Y as shown in Fig. 5-13-3.
5) Mount the PRE-AMP BRACKET and the PRE-AMP UNIT.

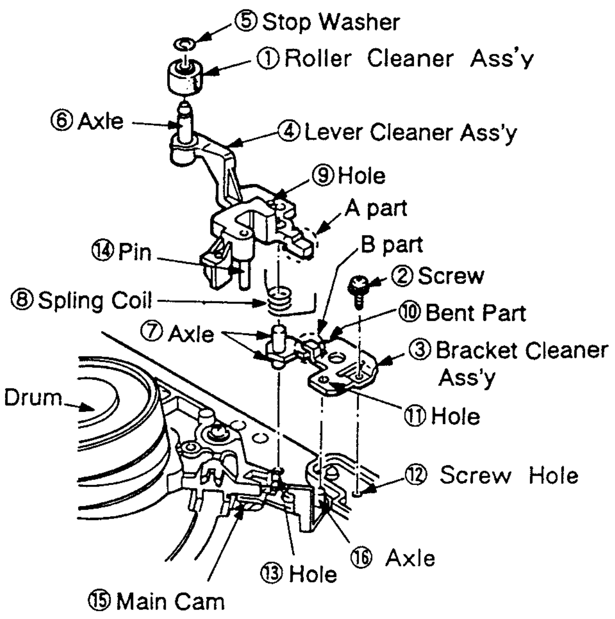
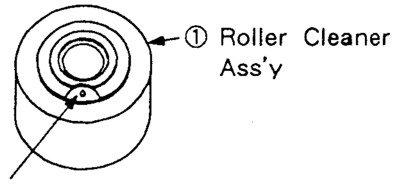

⑤ Stop Washer
① Roller Cleaner Ass'y
⑥ Axle
④ Lever Cleaner Ass'y
⑨ Hole
A part
⑭ Pin
B part
② Screw
⑧ Spling Coil
⑩ Bent Part
⑦ Axle
③ Bracket Cleaner Ass'y
Drum
⑪ Hole
⑫ Screw Hole
⑯ Axle
⑬ Hole
⑮ Main Cam

Fig. 5-13-1


① Roller Cleaner Ass'y

Mark should be up side when mounting.

Fig. 5-13-2

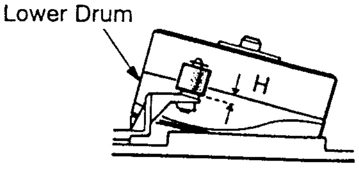

Lower Drum
H

Fig. 5-13-3

SECTION 6
MECHANISM ADJUSTMENTS

6-1. OPERATING THE MECHANISM WITH NO CASSETTE INSERTED (See Fig. 6-1-1.)

1) Attach black vinyl tape to the T. END and T. TOP sensors to prevent light from entering.
2) Push the TRAY LOCK LEVER in the direction of the arrow to maintain the unlocked condition. Release the lever just before the TRAY starts moving down.
3) In this condition, operation is possible in every mode. However, the following procedures are necessary to operate the unit in the REC, REW and R-SEARCH modes.

REC mode : Push the SAFETY SW LEVER to turn the SAFETY SWITCH (Erasure Prevention Switch) ON, then press the REC button. If the SAFETY SWITCH is not turned ON, the unit will enter the EJECT mode.

REW/R-SEARCH : After pressing the REW button, turn the TAKE-UP REEL ASS'Y by hand. Otherwise, the reel sensor will operate, setting the INITIAL mode after 2 to 3 seconds.

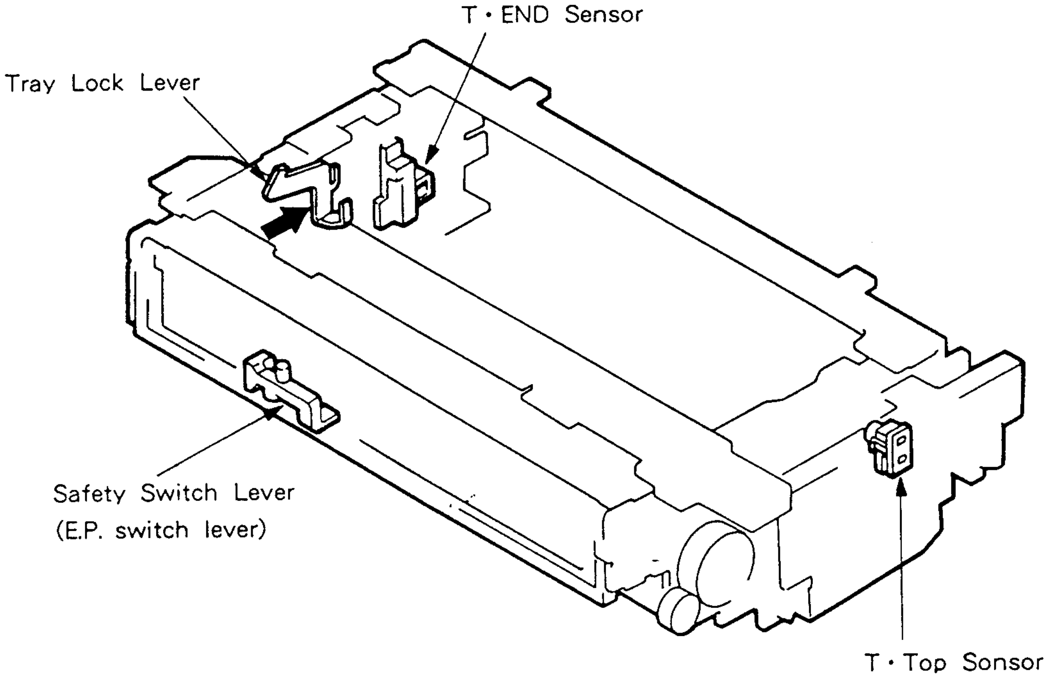


Fig. 6-1-1. Preparations for Adjustment

6-2. REEL TABLE HEIGHT ADJUSTMENT AND TORQUE CHECK

6-2-1. Reel Table Height (See Fig. 6-2-1.)

If the SUPPLY REEL ASS'Y or the TAKE-UP REEL ASS'Y is raplaced, it will be necessary to adjust the REEL TABLE height.

(1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
(2) Attach the master plane (H-7099-279-H) and reel disc height jig (H-7099-038-H) in the direction of the arrows.
(3) Confirm that, when the gauge stops, the REEL TABLEs are not in contact with surface A of the plate and side of the REEL TABLEs are in contact with surface B.
(4) If the REEL TABLE is in contact with surface A, remove a spacer and check again.
(5) If the REEL TABLE is not in contact with surface B, add a spacer and check again.
(6) Remove the master plane.
(7) Set the EJECT mode with the mode selector.
(8) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.

Note:

- Adjust the reel table height by adding or removing spacers(0.13t, 0.25t, 0.3t, 0.4t and 0.5t)as appropriate so that the height meets the specifications. Use the same method for both the TAKE-UP REEL TABLE and the SUPPLY REEL TABLE.
  (The 0.5t washer is included as the standard washer for the SUPPLY REEL ASS'Y. The 0.4t washer is included as the standard washer for the TAKE-UP REEL ASS'Y.)
- If the height of the reel table is not within the specified value, the tape edge might be damaged as a result, or the tape path adjustment might not be possible to make.

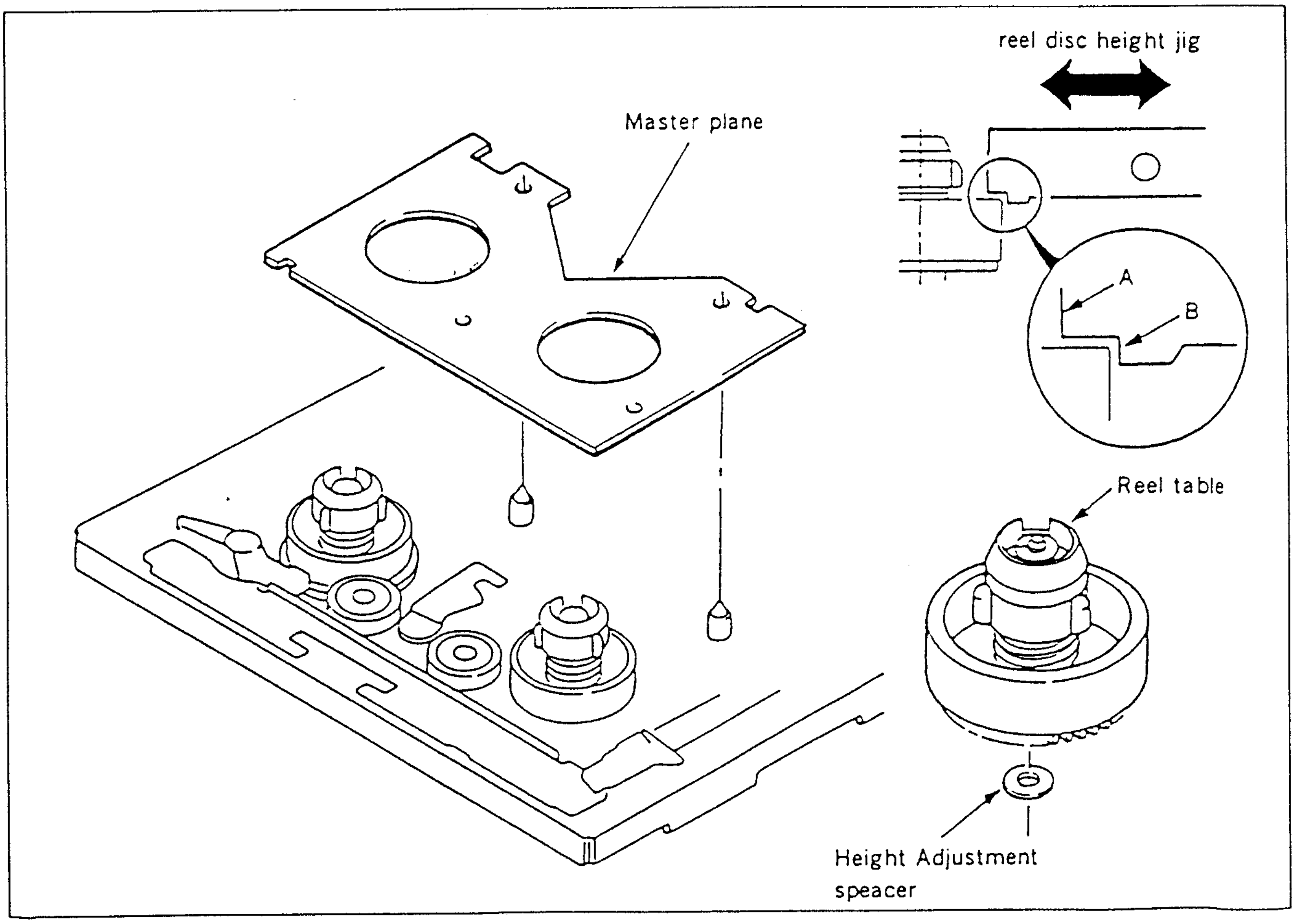


Fig. 6-2-1 . Reel Table Height Adjustment

6-2-2. Torque Check (See Fig. 6-2-2.)

1) Set the unit to operating condition without a cassette inserted as instructed in 6-1.
2) Measure the SUPPLY REEL TABLE torque in the REW mode, and confirm that it is 750gcm or more. Perform this measurement keeping the torque gauge in a fixed position with your hand (locked torque).
3) Measure the TAKE-UP REEL TABLE torque in the F.FWD mode, and confirm that it is 600gcm or more (locked torque).
4) Measure the TAKE-UP REEL TABLE torque in the playback mode (SP tape speed), and confirm that it is within 80 through 140gcm (locked torque).
5) Measure the SUPPLY REEL TABLE torque in the REV (F-SEARCH) mode, and confirm that it is within 150 through 240 gcm (locked torque).
6) After confirming that torque readings are within the specifications for each mode, check the following :
   - ⓐ Dirt on the capstan motor and the REEL PULLEY groove.
   - ⓑ Deterioration of the REEL DRIVE BELT.
   - ⓒ Deterioration of the FRICTION GEAR ASS'Y felt (torque during playback).
   - ⓓ Wear and damage of the COMPL CLUTCH MECHANISM and the reel drive system gears.

Note1 : Items ⓑ, ⓒ and ⓓ require replacement if found defective.

Note2 : The measured value of torque during FF and REW represents the value 2 seconds after starting.

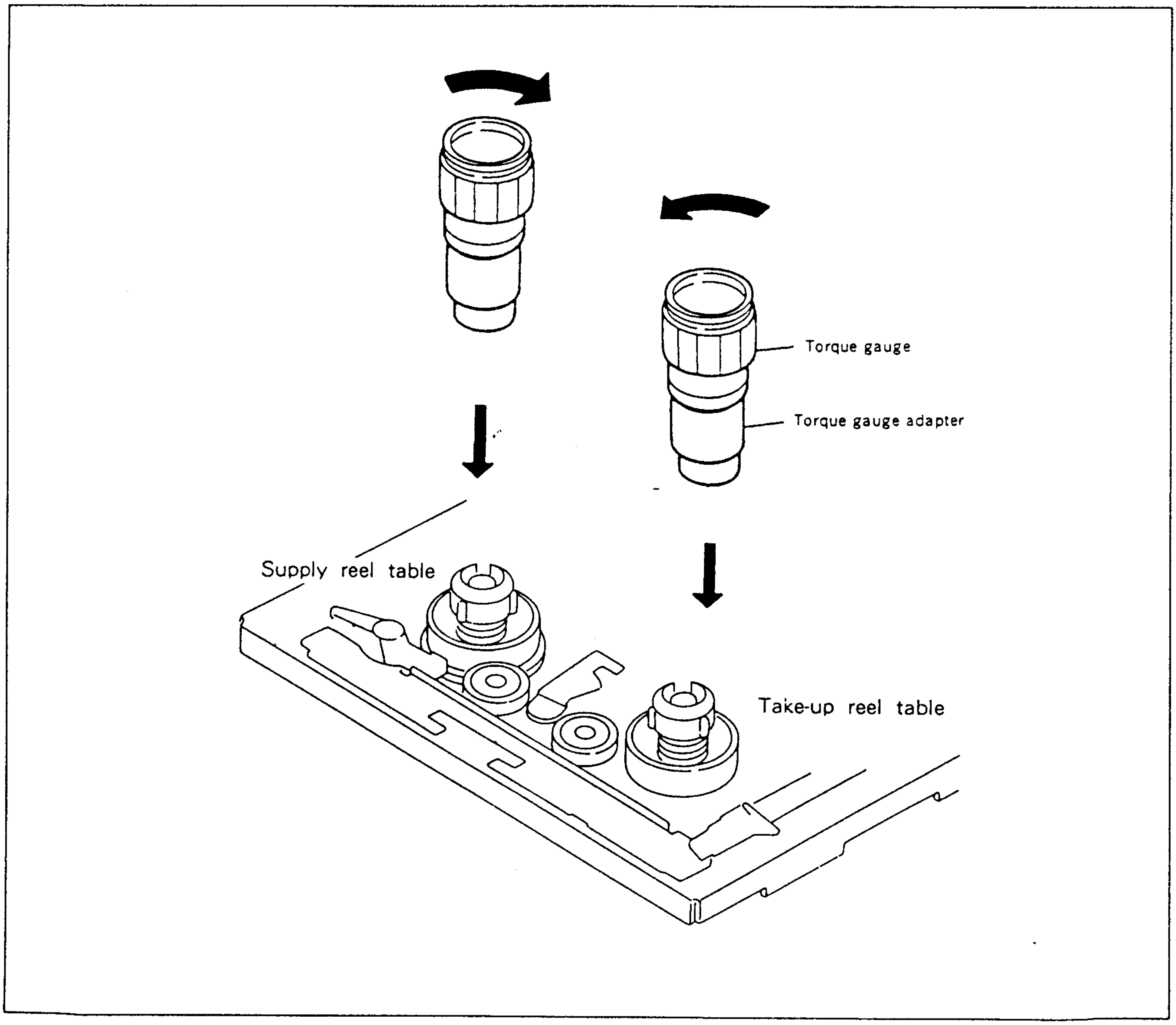


Fig. 6-2-2 Checking REW/FF/PLAY Torque

6-3. TENSION POLE (BACK TENSION GUIDE) POSITION ADJUSTMENT AND BACK TENSION TORQUE CHECK

6-3-1. Tension Pole (Back Tension Guide) Position Adjustment (See Fig. 6-3-1.)

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
2) Set the PLAY mode with the mode selector (VHJ-0050)
3) Confirm that the space between the end of chassis and the Tension arm is from 4mm to 6mm.
4) In case the tension pole is not withim 4-6mm, adjust it by loosening the screw ④ a little and changing the mounting position of the BAND HOLDER ⑤ in the direction of the arrow Ⓐ.
5) Set the EJECT mode with the mode selector.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
7) Confirm that back tension torque is within 42± 5gcm, as instructed in 6-3-2 below.

6-3-2. Back Tension Torgue Chack (See Fig. 6-3-1.)

1) Attach the cassette torquemeter (VHJ-0016) and set the PLAY mode.
2) Confirm that back tension torque is within 50 ± 10gcm.
3) In case back tension torque dose not meet the above specification, proceed as follows:

ⓐ Clean the portion where the brake band (BAND HOLDER ASS'Y) ⑦ of the SUPPLY REEL ASS'Y ⑥ makes contact.

ⓑ Confirm that the brake band of the BAND HOLDER ASS'Y ⑦ does not make wear and that it is clean. If wear or dirt is found, replace the band holder assembly ⑦ as instructed in 5-7-3 of Service Manual.

ⓒ Raplace the TENSION LEVER ASS'Y SPRING COIL ⑧.

Note : Always follow procedures in 6-3-1. Tension Pole Position Adjustment after performing ⓐ, ⓑ and ⓒ.

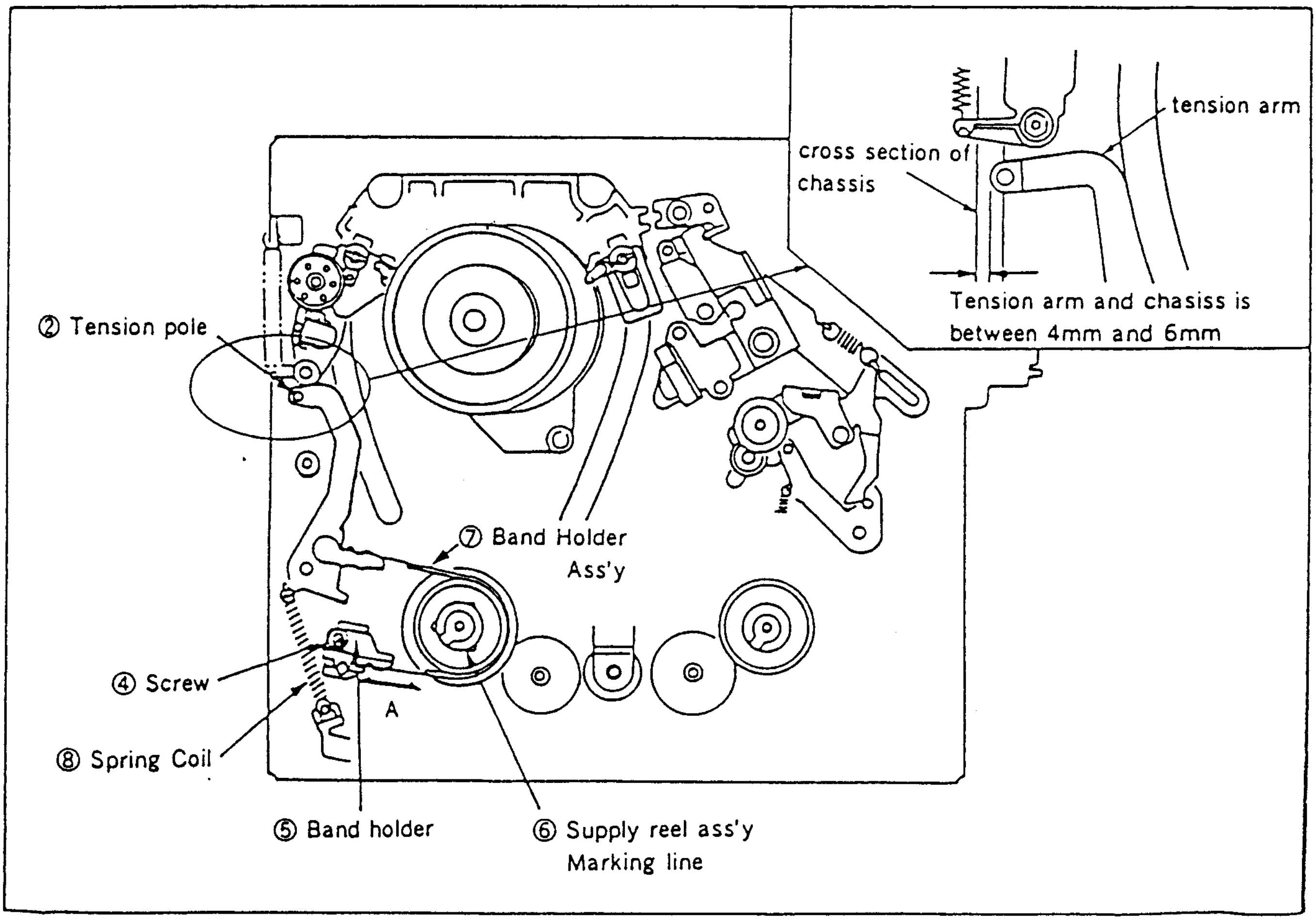

tension arm
cross section of chassis
Tension arm and chasiss is between 4mm and 6mm
② Tension pole
⑦ Band Holder Ass'y
④ Screw
A
⑧ Spring Coil
⑤ Band holder
⑥ Supply reel ass'y Marking line

Fig. 6-3-1. Tension Pole Positioning Adjustment

6-4. TAPE PATH ADJUSTMENT

The tape path mechanism is precisely adjusted at the factory. Normally no readjustment is required, but checking and/or adjustment is necessary when parts of the tape path mechanism among those shown in the figure below (See Fig. 6-4-1.) have been removed or replaced after a long period of use.
This operation consists of adjusting the various guides so that the tape drawn out from the supply reel runs smoothly along the DRUM (CYLINDER) lead surface. A way of grasping the tape path condition by electronic means is monitoring the video head output envelope waveform with an oscilloscope. However, the fact that visual observation is essential in order to know whether the tape is running through the various guides in a smooth and natural way should be kept in mind when checking and adjusting.
Also remember that the position of tape guides is not greatly affected by the replacement of the UPPER DRUM (UPPER CYLINDER) or the COMPL DRUM (COMPL CYLINDER), provided that it is correctly performed, and that only the replaced parts should be adjusted after replacing a tape guide or COMPL HEAD BRACKET, since the position of the other tape guides shall not change considerably.

6-4-1. Preparations for Adjustment

(1) Clean the tape transport surfaces (See Fig. 6-4-1.).
(2) Connect the oscilloscope. Connect the channel 1 probe to the envelope waveform test point, and the channel 2 probe to the SW30 (RF SW P) test point. During adjustment, apply a trigger to the low side of the SW30 (RF SW P) in order to monitor the waveform output from channel 1 of the video head.

Note : Since oscilloscope connection points differ according to the model, refer to the "Test Point for Tape Path Adjustment" allocation figure in the electric circuit adjustment section of the service manual book.

(3) Use a dentist's mirror for visual observation of tape path condition.
(4) Use an eccentric driver (VHJ - 0003) for adjustment of the guide rollers.
(5) When adjusting height of the fixed guide, guide rollers or COMPL head bracket, turn the special nut or the upper flange clockwise to push the tape downward, and counterclockwise to make the tape rise up.
(6) Do not use the damaged cassette tapes for tape path adjustment.

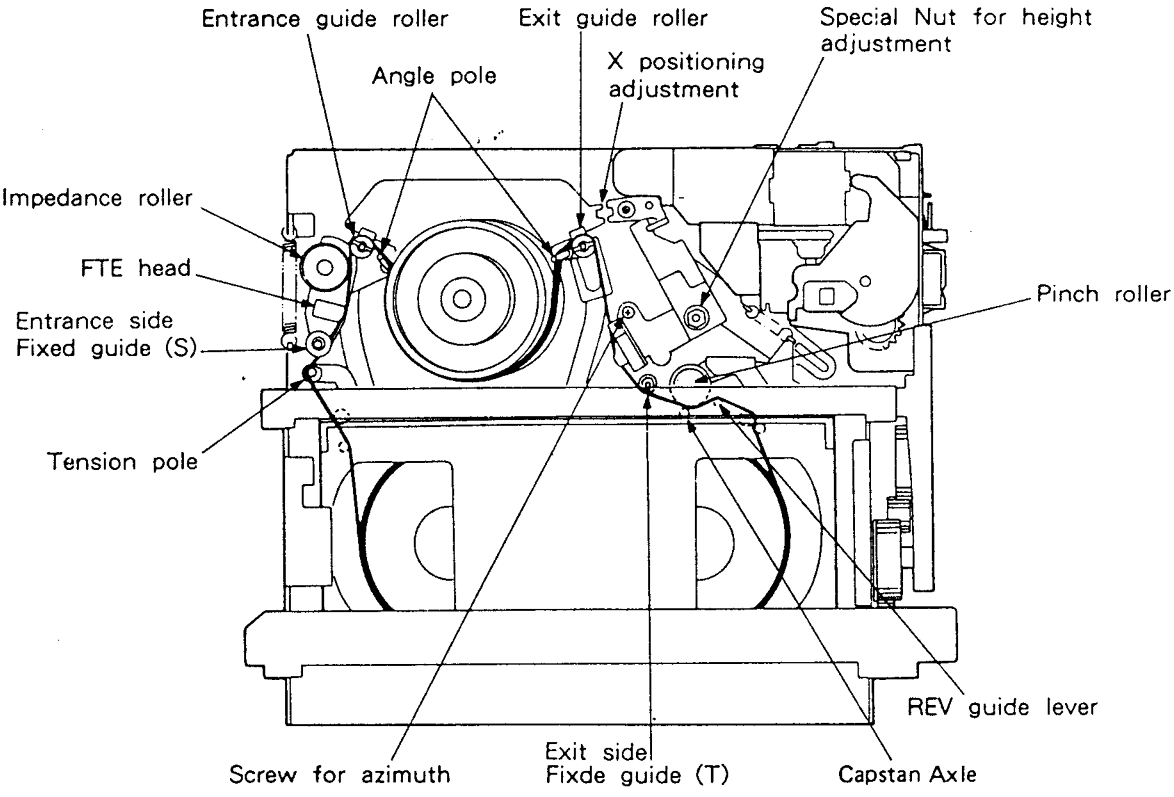

Entrance guide roller
Exit guide roller
Special Nut for height adjustment
Angle pole
X positioning adjustment
Impedance roller
FTE head
Entrance side Fixed guide (S)
Pinch roller
Tension pole
REV guide lever
Screw for azimuth adjustment
Exit side Fixde guide (T)
Capstan Axle

Fig. 6-4-1. Preparation for Adjustment

6-4-2. Adjustment by Visual Observation after Guide Roller, COMPL Head Bracket Replacement

Perform this adjustment after removing or replacing any of the above parts. Only for the replaced or removed parts, play back an alignment tape (VHJ-0009) beforehand and adjust height by visual observation.

(1) Guide Rollers (See Fig. 6-4-3.)
The tape should not be curled by the guide roller upper and lower flanges. It should also run smoothly, without moving up and down on the DRUM (CYLINDER) lead surface.

Note : An excessive guide roller pressure may cause tape damage.

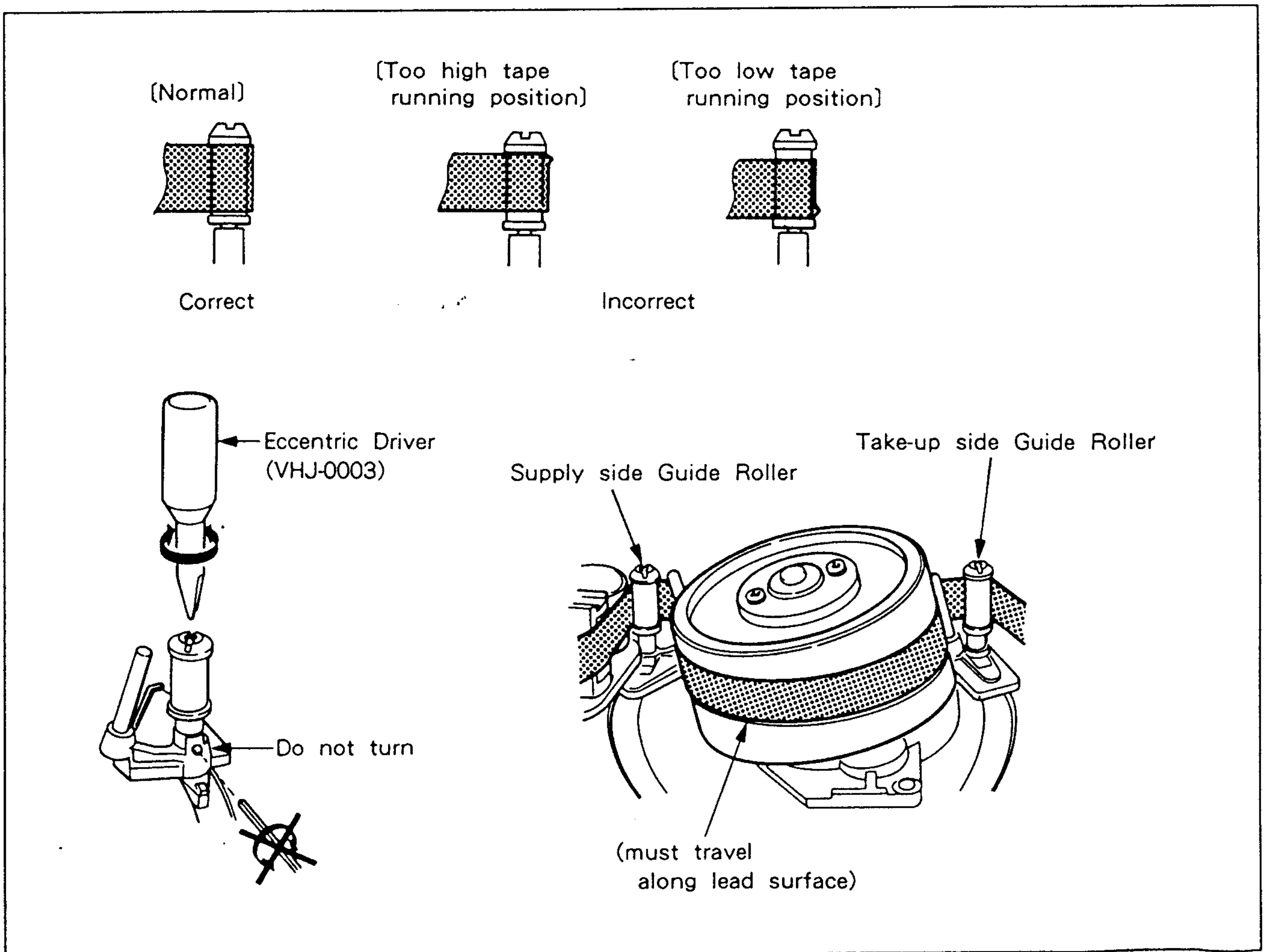

(Normal)
(Too high tape running position)
(Too low tape running position)
Correct
Incorrect
Eccentric Driver (VHJ-0003)
Do not turn
Supply side Guide Roller
Take-up side Guide Roller
(must travel along lead surface)

Fig. 6-4-2. (2) Pre-set for Guide Roller

(2) COMPL Head Bracket (ACE Head) (See Fig. 6-4-3.)
Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

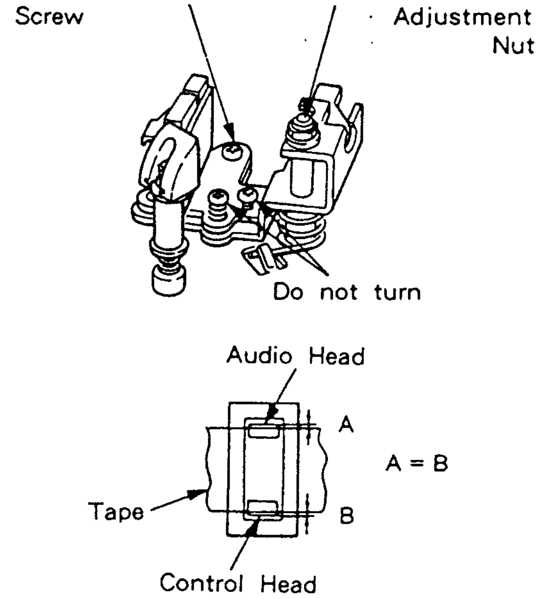

Azimuth Adjustment Screw
ACE Head Height Adjustment Nut
Do not turn
Audio Head
A
A = B
Tape
B
Control Head

Fig. 6-4-3. (3) Pre-set for Compl Head Bracket

6-4-3. Guide Roller Adjustment (See Fig. 6-4-4.)

1) Play back the alignment tape (VHJ-0009), press the tracking control key and adjust the envelope waveform to the maximum level.
2) Loosen the entrance and exit guide rollers by rotating them counterclockwise, then rotate them clockwise alternately until they are fastened and a flat video output waveform is obtained.
3) Confirm that the envelope waveform is not deformed, and check visually that no curling occurs at the guide roller upper and lower flanges.
4) Press the tracking control key and set the envelope waveform level to approx. 50% of the maximum. In this condition, confirm whether the envelope waveform is flat. It will not, showing valleys or peaks at the first half (entrance) or second half (exit), if the guide roller pressure is excessive or insufficient.
   In case there is unevenness in the first half (entrance), adjust the entrance side guide roller. If the second half (exit) shows trouble, adjust finely the exit side guide roller.

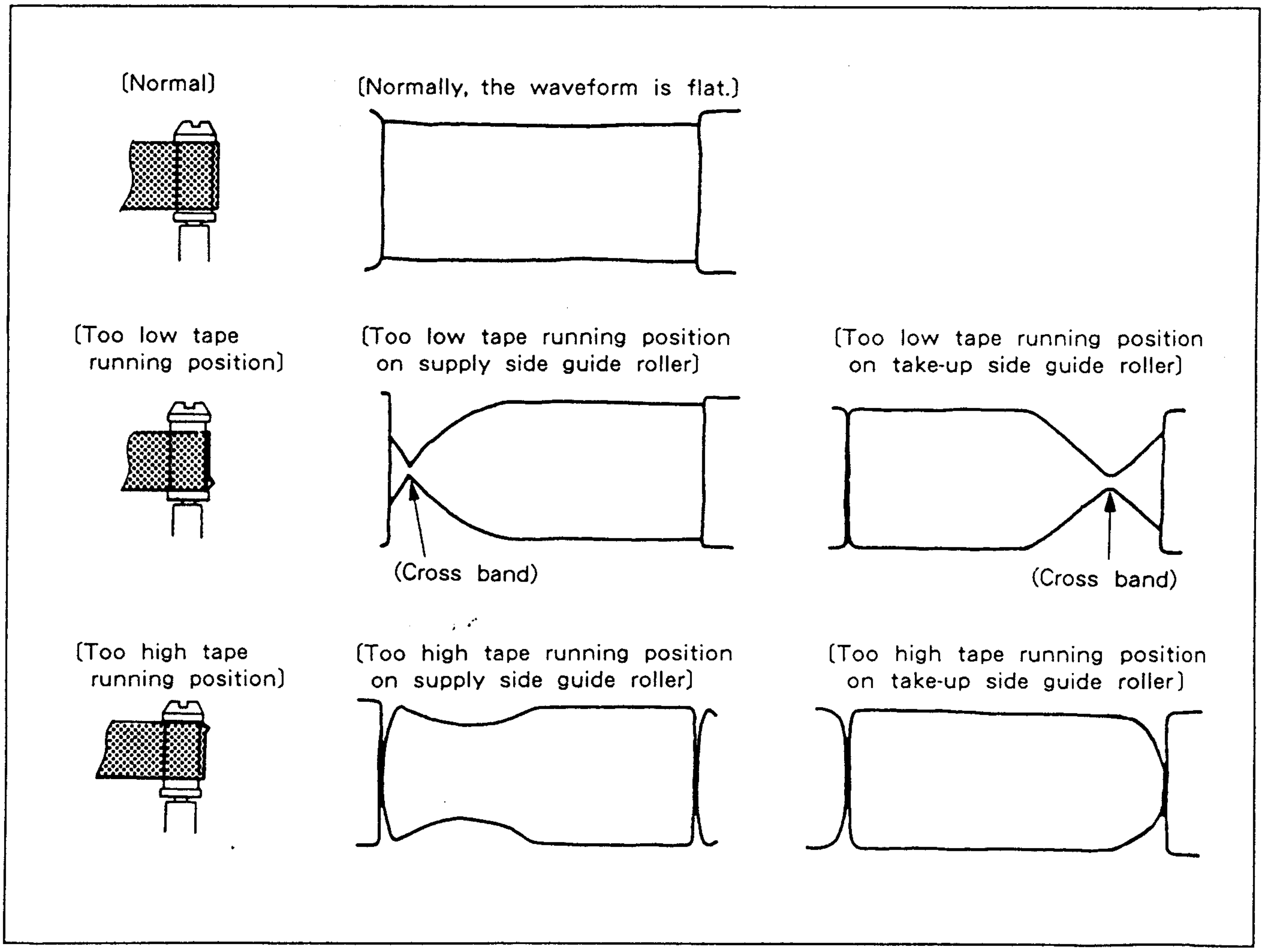

(Normal)
(Normally, the waveform is flat.)
(Too low tape running position)
(Too low tape running position on supply side guide roller)
(Too low tape running position on take-up side guide roller)
(Cross band)
(Cross band)
(Too high tape running position)
(Too high tape running position on supply side guide roller)
(Too high tape running position on take-up side guide roller)

Fig. 6-4-4. Guide Roller Adjustment

6-4-4. COMPL Head Bracket (ACE Head) Adjustment

(1) Height Adjustment and Azimuth Adjustment (See Fig. 6-4-5.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Monitor the audio output waveform with the oscilloscope.
3) Rotate the azimuth adjustment screw until the audio output waveform amplitude is maximum.
4) After loosening the ACE head height adjustment special nut, rotate it slowly clockwise until amplitude of the audio output waveform is maximum, then adjust it finely clockwise to the point just before the said waveform amplitude begins to decrease.
5) Rotate the azimuth adjustment screw until amplitude of the audio output waveform is maximum.
6) Confirm that the audio output waveform amplitude does not fluctuate.

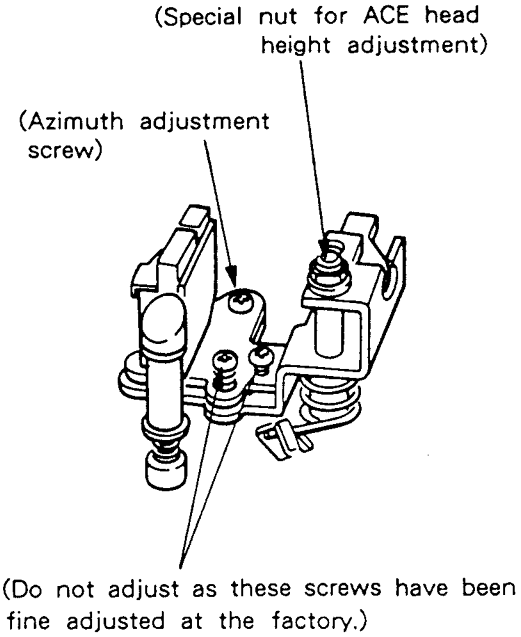

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Do not adjust as these screws have been fine adjusted at the factory.)

Fig. 6-4-5. Compl Head Bracket

(2) Tracking (X Value) Adjustment (See Fig. 6-4-6.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.

2) Set tracking to the center position with the tracking control key (See Note below).

3) Rotate the stopper bracket fixing screw 180° counterclockwise.

4) Monitor the video head output envelope waveform with the oscilloscope.

5) Adjust the stopper bracket position so that amplitude of the envelope waveform becomes maximum at the tracking center and the envelope waveform amplitude changes by the same amount when shifting the tracking center by pressing the plus (+) and minus (−) tracking control keys.

6) Tighten the fixing screw.

7) (Model for LP mode tape speed capability)
Playback the alignment tape (VHJ-0052) and set the tracking to the center using a tracking control key.
Then confirm that the playback picture on screen is normal. If not, Make readjustment by referring to items 1) through 7). To readjust, playback VHJ-0009 and finely adjust the position of the stopper bracket within the range in which the amplitude of the envelope waveform can be held to a maximum.

8) Perform servo circuit PB PHASE (Switching position) adjustment.

Note : For models equipped with auto tracking, always set to the manual tracking mode before adjustment. To confirm the tracking center position, press the tracking keys (+, −) and observe the front panel clock display. It will read "T − : −" at the tracking center, "T − : , T − − : " when keeping the minus (−) key pressed, and "T : −, T : − −" when keeping the plus (+) key pressed. The time indication will be restored 2 to 3 seconds after the tracking keys are released.

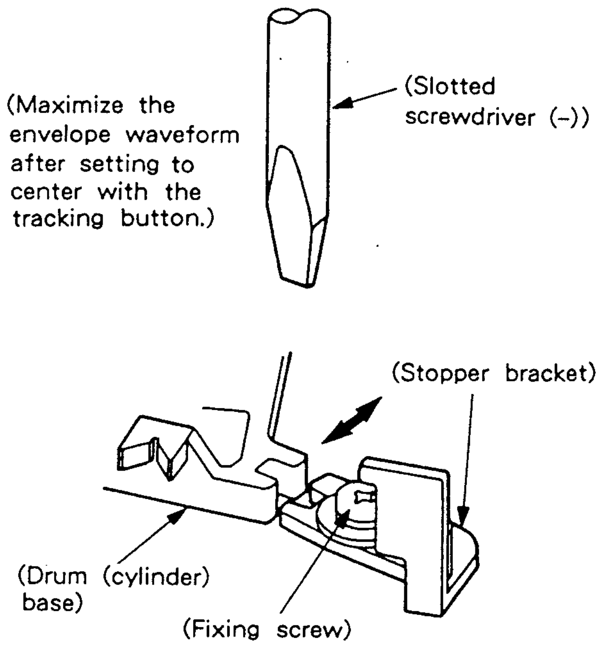

(Maximize the envelope waveform after setting to center with the tracking button.)
(Slotted screwdriver (−))
(Stopper bracket)
(Drum (cylinder) base)
(Fixing screw)

Fig. 6-4-6.

SECTION 7
ELECTRICAL ADJUSTMENTS

1. CIRCUIT BOARD LOCATIONS
1-1. MAIN BOARDS

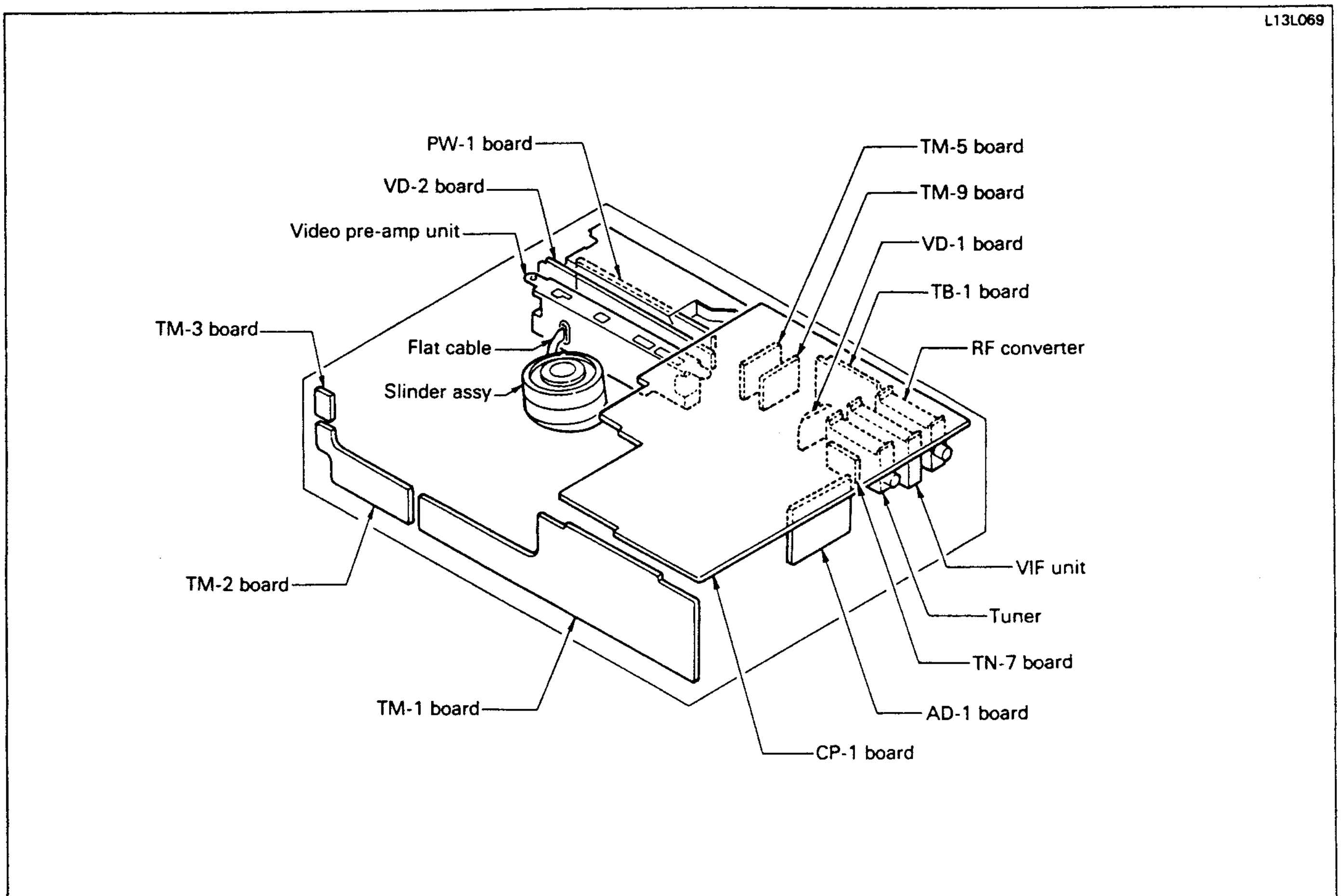

L13L069
PW-1 board
VD-2 board
Video pre-amp unit
TM-3 board
Flat cable
Slinder assy
TM-2 board
TM-1 board
TM-5 board
TM-9 board
VD-1 board
TB-1 board
RF converter
VIF unit
Tuner
TN-7 board
AD-1 board
CP-1 board

Fig. 1-1

1-2. LOCATION FOR TAPE PATH ADJUSTMENT

NOTE: Test point TP182 and TP183 for tape path adjustment is shown in figure below.

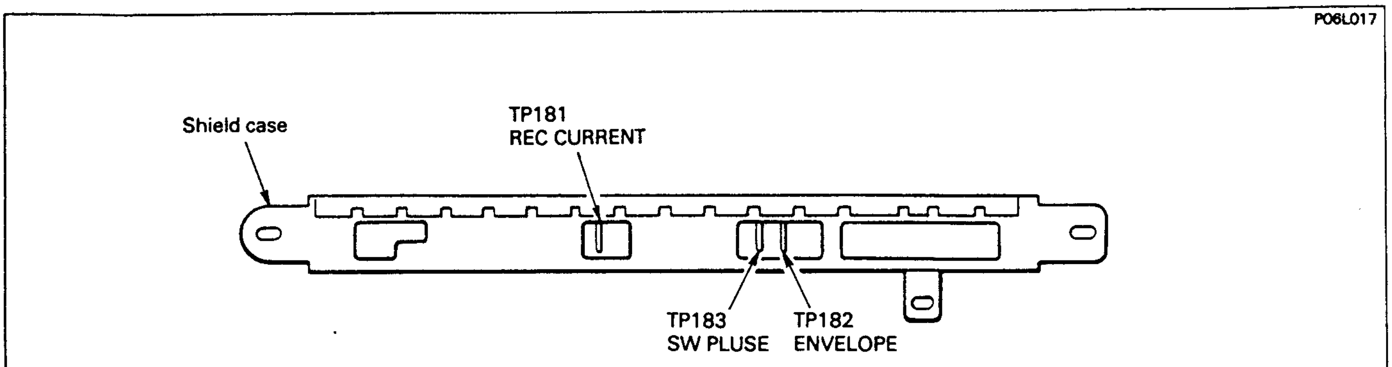

P06L017
Shield case
TP181
REC CURRENT
TP183
SW PLUSE
TP182
ENVELOPE

Fig. 1-2 Video pre-amp unit

2. ELECTRICAL ADJUSTMENT

2-1. PREPARATION

2-1-1. EQUIPMENT

- Colour TV monitor
- PAL Colour-bar generator (with RF and LINE OUTPUT)
- NTSC Colour-bar generator (with RF and LINE OUTPUT)
- Audio signal generator
- Oscilloscope (dual trace; frequency response. 10MHz or more; probe: 10:1)
- Frequency counter (countable to 10MHz or higher)
- Digital voltmeter
- AC voltmeter
- In/output probes

[Alignment Tape (HM-1)] (H-7099-046-H) (NTSC)

	Mode	Time	Video signal	Audio signal
1	SP	10 minutes	Stair-step	7kHz
2	SP	5 minutes	–	3kHz
3	SP	10 minutes	Color bar	1kHz
4	SP	3 minutes	RF sweep	–

[Alignment Tape (MH-2)] (H-7099-052-H) (PAL)

In making the adjustment, an alignment tape for VHS (PAL). If a model is specified, be sure to use a tape of the model. If not either model of a tape can be used.

	Time	Video signal	Audio signal
1	10 minutes	Stair-step	6kHz
2	5 minutes	–	3kHz
3	10 minutes	Color bar	1kHz
4	3 minutes	RF sweep	–

[Alignment Tape (MH-4)] (H-7099-053-H) (SECAM)

- Relay jig (VHJ-0066) 7-wire cable for Pre-amp unit
  Connect the Flat cable end from the Drum assembly to the Pre-amp unit using the Relay jig to provide simple repairing and adjustment of the Pre-amp unit, as shown in Fig. 2-1-1. Further, when adjusting the Pre-amp unit, be sure to make contact an end of Shield case with Bracket of the Pre-amp unit to maintain the shield effect.

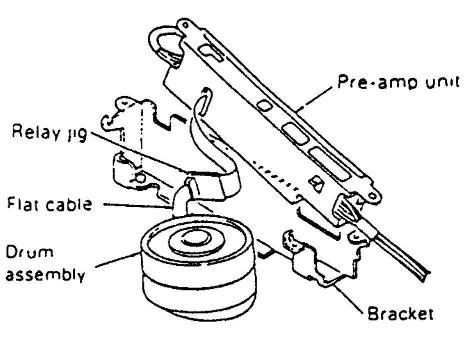


Fig. 2-1-1

2-1-2. SET-UP

Because the RF input signal is used for circuit adjustments, connect the colour-bar generator to the ANT IN terminal of the VCR. The RF input signal is processed by the tuner and IF circuit. It is important that the video output signal of the IF circuit satisfies the items shown in Fig. 2-1-2. Connect the oscilloscope to the VIDEO OUTPUT terminal of the video circuit and terminate with a 75Ω load, and then check the video output signal.

- The amplitude of the sync signal should be approximately 0.3 Vp-p.
- The amplitude of the video signal should be approximately 0.7 Vp-p.
- While observing the oscilloscope or TV screen, make fine-tuning adjustments so that the colour burst amplitude is approximately 0.3 Vp-p.
- Check to be sure that there is no spike noise in the sync part of the horizontal sync signal.

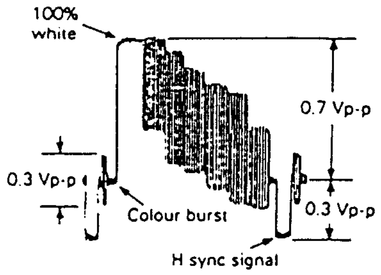
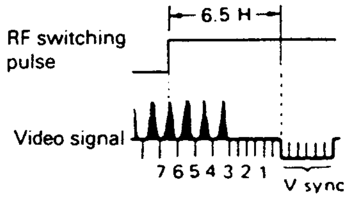
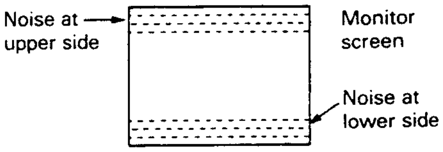
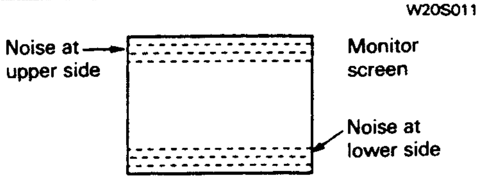


Fig. 2-1-2

2-3. SERVO CIRCUIT ADJUSTMENT ... CP-1 board

NOTE (1) : These adjustments should be carried out upon completion of the transport adjustments.
(2) : If the tape transport adjustments are carried out after these adjustments, follow the procedures again in SWITCHING POSITIONS.
(3) : Set the COLOR SYSTEM SELECT switch on the front control panel to "AUTO" position.

No.	Item	Input	Mode	Point	Location	Remark
1	SWITCHING POSITION	Alignment cassette (MH-2)	PLAY	VIDEO OUTPUT TP101 RF SW pulse TP351	VR351	W25S001  6.5 H RF switching pulse Video signal 7 6 5 4 3 2 1 V sync 1. Turn VR351 fully counter clockwise (seeing from the foil side) in the STOP mode. 2. Set the tracking control position to the center. (Tracking center position display in the indicator panel "T—:—"). 3. Playback alignment cassette and adjust VR351 so that the phase of the leading edge of the vertical sync signal is delayed 6.5 ± H from the rise of the RF switching pulse waveform. 4. If the adjustment value does not change by adjustment, repeat steps 1 through 3.
2	SP STILL V-LOCK	Colour bar from Colour bar generator	SP mode REC ↓ PLAY ↓ STILL	TV screen	TRACKING V-LOCK ADJUST buttons (Front panel)	1. Set the SP REC mode and after recording the colour-bar signal, play it back. 2. Set the SP STILL mode, and while watching the monitor screen, adjust the V-jitter (very fine movement of the vertical sync) at the center of screen to the minimum by pressing TRACKING buttons (▼) or (▲).
3	SP SLOW TRACKING	Colour bar from Colour bar generator	SP mode REC ↓ PLAY ↓ SLOW	TP183 RF SW pulse TP354 CTL pulse	TV screen	W20S011  Noise at upper side Monitor screen Noise at lower side 1. Put the VCR in the SP REC mode and record at the middle of the cassette tape. 2. Playback the recorded part, and VCR in the SP SLOW mode by remote control unit. 3. Adjust the tracking to the center position by pressing TRACKING buttons (▼) and (▲) simultaneously. 4. Check that there is no noise on the SP SLOW playback screen within about three seconds after step 3 and press the REC button. 5. With the tracking center position, check the position of the noise which appears at the top of the screen is similar to that of the noise which appears at the bottom judging from the center of the screen, but if not, readjust the TRACKING buttons and press the REC button to maintain the tracking condition.
4	LP STILL V-LOCK	Colour bar from Colour bar generator	LP mode REC ↓ PLAY ↓ STILL	TV screen	TRACKING V-LOCK ADJUST buttons (Front panel)	1. Set the LP REC mode and after recording the colour-bar signal, play it back. 2. Set the LP STILL mode, and while watching the monitor screen, adjust the V-jitter (very fine movement of the vertical sync) at the center of screen to the minimum by pressing TRACKING buttons (▼) or (▲).

No.	Item	Input	Mode	Point	Location	Remark
5	LP SLOW TRACKING	Colour bar from Colour bar generator	LP mode REC ↓ PLAY ↓ SLOW	TV screen	TRACKING V-LOCK ADJUST buttons REC button	 W20S011 Noise at upper side Monitor screen Noise at lower side 1. Put the VCR in the LP REC mode and record at the middle of the cassette tape. 2. Playback the recorded part, and VCR in the LP SLOW mode by remote control unit. 3. Adjust the tracking to the center position by pressing TRACKING buttons (▼) and (▲) simultaneously. 4. Check that there is no noise on the LP SLOW playback screen within about three seconds after step 3 and press the REC button. 5. With the tracking center position, check the position of the noise which appears at the top of the screen is similar to that of the noise which appears at the the bottom judging from the center of the screen, but if not, readjust the TRACKING buttons and press the REC button to maintain the tracking condition.

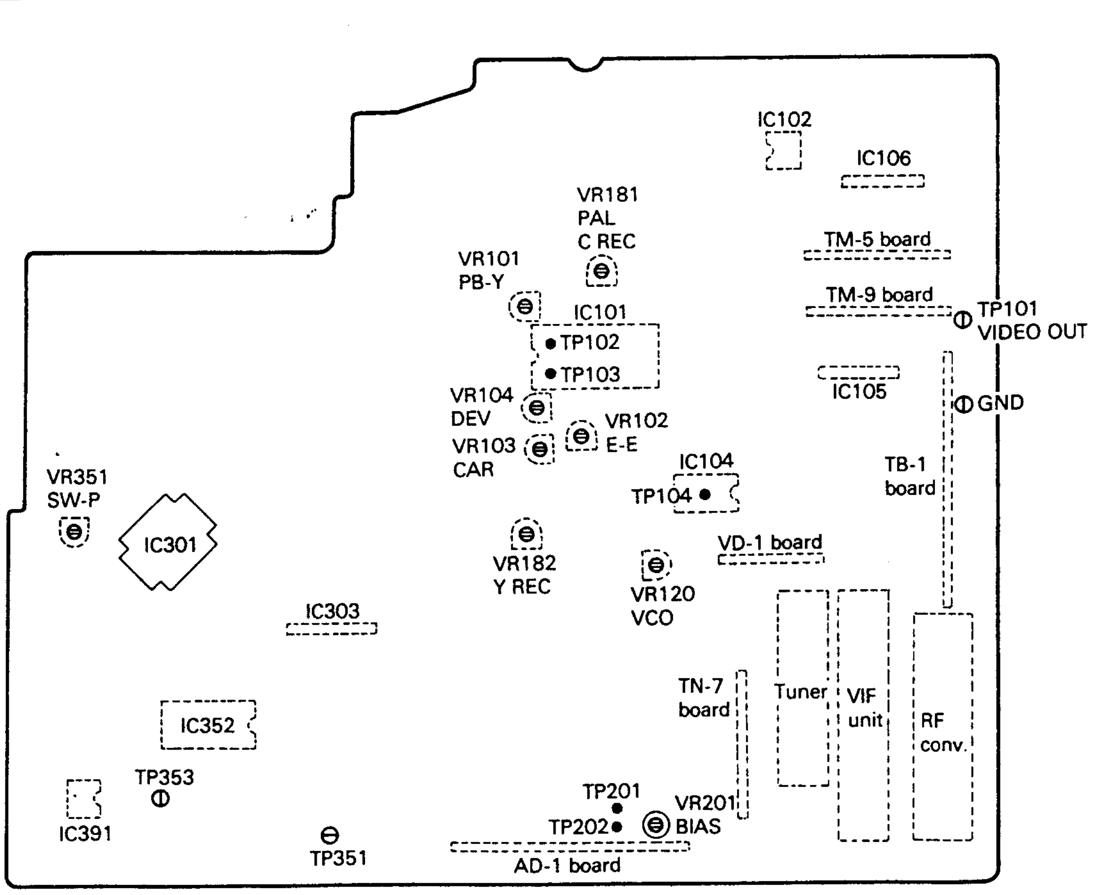

P13S048
IC102
IC106
VR181
PAL
C REC
TM-5 board
VR101
PB-Y
TM-9 board
IC101
TP101
VIDEO OUT
TP102
TP103
IC105
GND
VR104
DEV
VR102
E-E
VR103
CAR
IC104
TB-1
board
VR351
SW-P
TP104
IC301
VD-1 board
VR182
Y REC
VR120
VCO
IC303
TN-7
board
Tuner
VIF
unit
RF
conv.
IC352
TP353
TP201
VR201
IC391
TP202
BIAS
TP351
AD-1 board

Fig. 2-2-1 CP-1 board (Foil side view)

2-3. VIDEO CIRCUIT ADJUSTMENT ... CP-1 board and Video pre-amp unit

NOTE (1) : Use the Relay jig mentiond in the 2-1. PREPARATION to provide easy adjustment of the Pre-amp unit.
(2) : When adjustment No. 1, No. 2 and No. 4 below, terminate VIDEO OUTPUT TP101 at 75 ohms.
(3) : "No-signal REC mode" is not to supply any signal to VIDEO INPUT terminal.
(4) : Unless otherwise specified COLOR SYSTEM SELECT switch (on the front panel) to "AUTO" position.

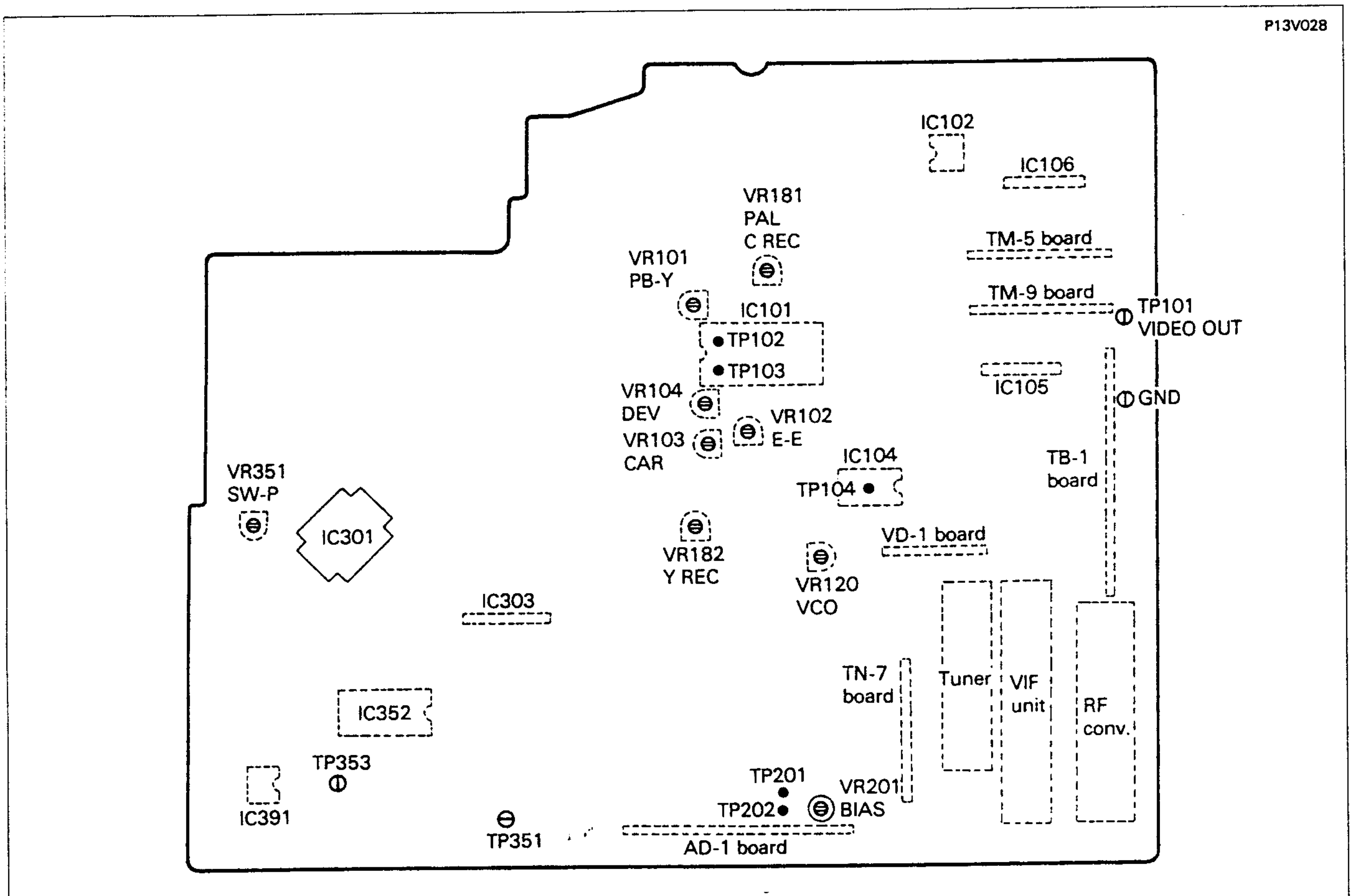
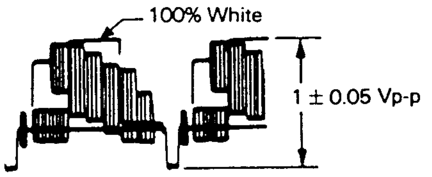
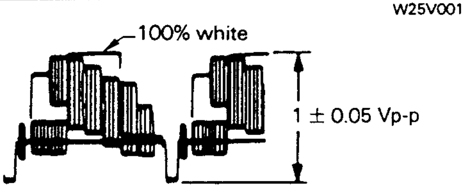
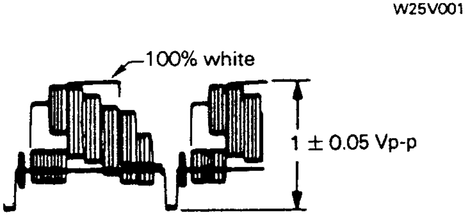
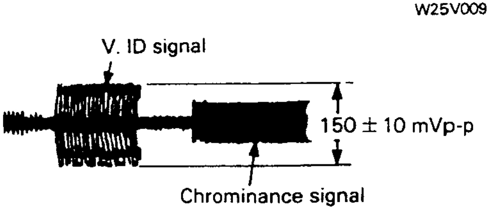
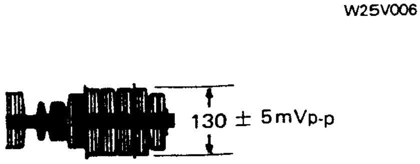
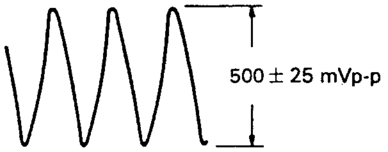
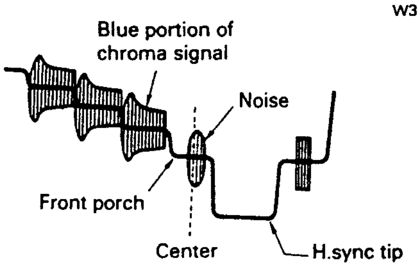
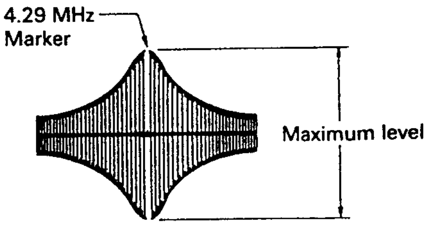

P13V028
IC102
IC106
VR181
PAL
C REC
TM-5 board
VR101
PB-Y
TM-9 board
TP101
VIDEO OUT
IC101
TP102
TP103
IC105
GND
VR104
DEV
VR102
E-E
VR103
CAR
IC104
TB-1
board
VR351
SW-P
TP104
IC301
VD-1 board
VR182
Y REC
VR120
VCO
IC303
TN-7
board
Tuner
VIF
unit
RF
conv.
IC352
TP353
IC391
TP201
VR201
TP202
BIAS
TP351
AD-1 board

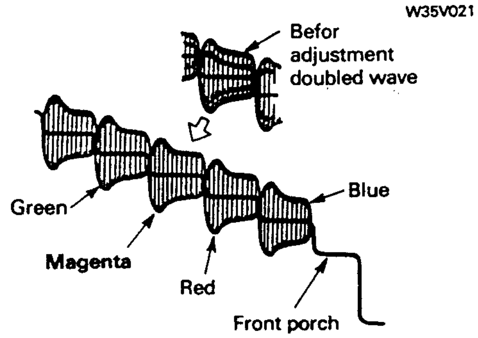
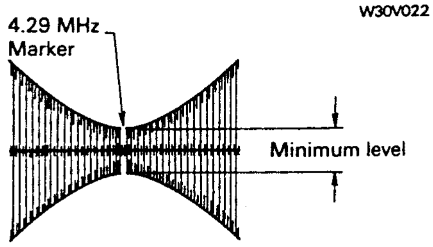
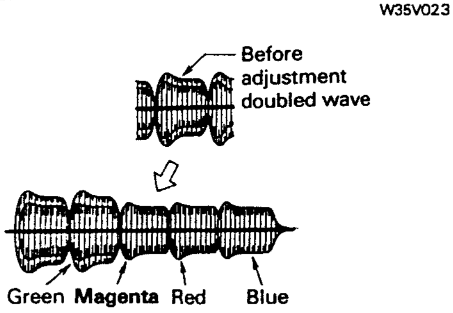
Fig. 2-3-1 CP-1 board (Foil side view)

No.	Item	Input	Mode	Point	Location	Remark
1	E-E LEVEL	PAL Colour bar (100% white level) from Colour bar generator	E-E	VIDEO OUTPUT TP101 (CP-1 board)	VR102 (CP-1 board)	W25V001  100% White 1 ± 0.05 Vp-p 1. Adjust VR102 so that the level is 1.00 ± 0.05 Vp-p.

No.	Item	Input	Mode	Point	Location	Remark
2	PB-Y LEVEL	Alignment cassette (MH-2)	PLAY	VIDEO OUTPUT TP101 (CP-1 board)	VR101 (CP-1 board)	 1. Adjust VR101 so that the level is 1.00 ± 0.05 Vp-p.
3	CARRIER SET	Colour bar from Colour bar generator ↓ No-signal	PAL and REC	TP103 (CP-1 board)	VR103 (CP-1 board)	1. Input the PAL colour bar signal to VIDEO INPUT terminal. 2. Set the channel selector button to the "AV" position and put the VCR in the PAL and REC mode. 3. Put the VCR in the no-signal REC mode and adjust VR103 so that the frequency is 3.80 ± 0.05 MHz immediately.
4	DEVIATION	PAL Colour bar (100% white level) from Colour bar generator	REC (Adjustment) ↓ PLAY (Check)	VIDEO OUTPUT TP101 (CP-1 board)	VR104 (CP-1 board)	 1. Insert the blank tape to the VCR and record colour bar signal. 2. Playback the recorded part, and check that the level is 1.00 ± 0.05 Vp-p. 3. Repeat adjust VR104 before the record, and the playback it, if not satisfactory.
5	SECAM C REC CURRENT	SECAM Colour bar from Colour bar generator	REC	TP181 (HOT) shield case (GND) (Pre-amp unit)	VR183 (CP-1 board)	 W25V009 V. ID signal 150 ± 10 mVp-p Chrominance signal 1. Set the COLOR SYSTEM SELECT switch to "SECAM" position. 2. Rotate VR182 so that the luminance level is minimize. 3. Adjust VR183 so that the level is 150 ± 10 mVp-p.
6	PAL C REC CURRENT	PAL Colour bar from Colour bar generator	REC	TP181 (HOT) shield case (GND) (Pre-amp unit)	VR181 (CP-1 board)	 1. Rotate VR182 so that the luminane level is minimize. 2. Adjust VR181 so that the level is 130 ± 5 mVp-p.

No.	Item	Input	Mode	Point	Location	Remark
7	Y REC CURRENT	No-signal	PAL and REC	TP181 (HOT) shield case (GND) (Pre-amp unit)	VR182 (CP-1 board)	W20V007  1. Set the channel selector buttons to AV position and put the VCR in the no-signal PAL and REC mode. 2. Adjust VR182 so that the level is 500 ± 25 mVp-p.
8	SYNC GATE	Alignment cassette (MH-4)	PLAY	VIDEO OUTPUT TP101 (CP-1 board)	VR131 (CP-1 board)	W35V012  Blue portion of chroma signal Noise Front porch Center H.sync tip 1. Observe the blue portion and front porch portion of the playback chroma signal. 2. Adjust VR131 so that the maximum amplitude point of noise component, which appears at the right end of the blue portion, is set to slightly right of the center of front porch as shown in the figure. At this time, be careful not to set the maximum amplitude point to the right side excessively, otherwise the noise component is superimposed on sync tip portion. 3. If the hue is considerably different from that of E-E picture, perform step 2 again. * When the noise component is placed at the left of center of front porch, the hue of the background of screen (Philips pattern) has a tinge of pink.
9	BELL FILTER 1 (Use a sweep generator	Sweep signal from Sweep generator	REC	TP132 (VD-2 board)	XF153 (VD-2 board)	W30V020  1. Connect the sweep generator to VIDEO INPUT terminal and the oscilloscope to TP132. 2. Adjust XF153 so that the marker portion of 4.29 ± 0.04 MHz is maximum level.

Following item represent a simple method to adjust for "BELL FILTER 1".

No.	Item	Input	Mode	Point	Location	Remark
10	BELL FULTER 1 (Use a Colour bar generator)	SECAM Colour bar (100% white level) from Colour bar generator	PLAY	VIDEO OUTPUT TP101 (CP-1 board)	XF153 (CP-1 board)	 W35V021 Befor adjustment doubled wave Green Magenta Red Blue Front porch 1. Connect the oscilloscope to VIDEO OUT (TP101). 2. Observe the Magenta portion of the playback chroma signal. 3. Adjust by tuning XF153 so that double waves of Magenta portion on the screen are superposed, becomming single wave.
11	BELL FILTER 2 (Use a sweep generator) **Following item represent a simple method to adjust for "BELL FILTER 2".**	Sweep signal from Sweep generator	REC	CN152 pin 1 (VD-2 board)	XF154 (VD-2 board)	 W30V022 4.29 MHz Marker Minimum level 1. Connect the sweep generator to VIDEO INPUT terminal and the oscilloscope to CN152 pin 1. 2. Adjust XF154 so that the marker portion of 4.29 ± 0.04 MHz is minimum level.
12	BELL FILTER 2 (Use a Colour bar generator)	SECAM Colour bar (100% white · level) from Colour bar generator	REC	CN152 Pin 1 (VD-2 board)	XF154 (VD-2 board)	 W35V023 Before adjustment doubled wave Green Magenta Red Blue 1. Connect the oscilloscope to CN152 pin 1. 2. Observe the Magenta portion of the recording chroma signal. 3. Adjust by tuning XF154 so that double waves of Magenta portion on the screen are superposed, becomming single wave.

No.	Item	Input	Mode	Point	Location	Remark
13	VCO FREQUENCY	Alignment cassette (VHJ-0008)	PLAY	TP104	VR120	1. Connect a lead wire between J1491 and J1492 on the CP-1 PCB. 2. Adjust VR120 so that the frequency is 15.75 KHz +0.2/−0.5 KHz. 3. Remove a lead wire.

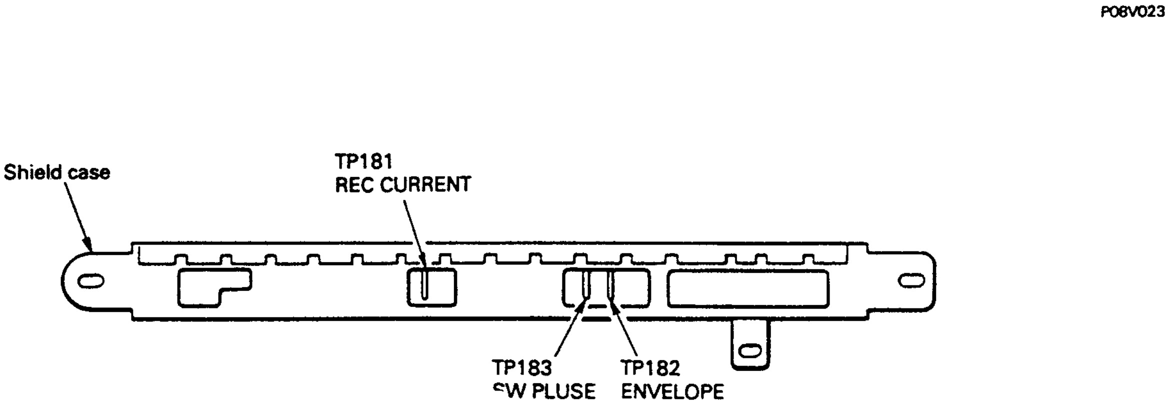
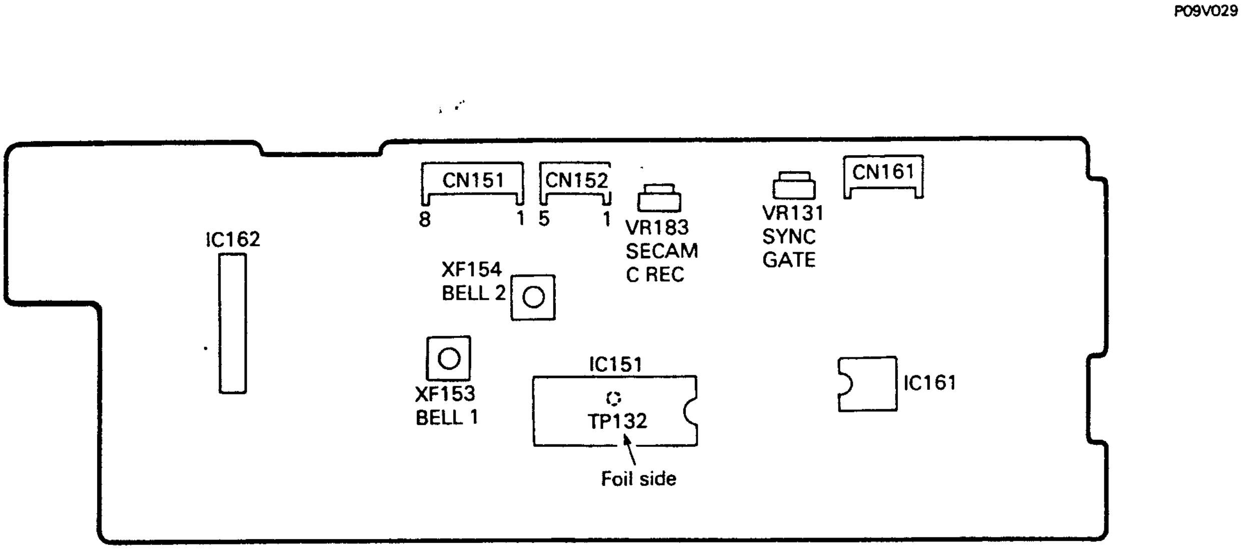

P08V023
Shield case
TP181
REC CURRENT
TP183
SW PLUSE
TP182
ENVELOPE

Fig. 2-3-2 Video pre-amp unit


P09V029
CN151
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CN152
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VR183
SECAM
C REC
VR131
SYNC
GATE
CN161
IC162
XF154
BELL 2
XF153
BELL 1
IC151
TP132
Foil side
IC161

Fig. 2-3-3 VD-2 board (Parts side view)

2-5. AUDIO CIRCUIT ADJUSTMENT ... CP-1 board

No.	Item	Input	Mode	Point	Location	Remark
1	BIAS LEVEL	No-signal	REC	TP201 (HOT) TP202 (GND)	VR201	1. Set the channel selector buttons to the AV position and put the VCR in the no-signal REC mode. 2. Adjust VR201 so that the level is 22 mVrms.

2-6. TUNER IF CIRCUIT ADJUSTMENT ... VIF unit

No.	Item	Input	Mode	Point	Location	Remark
1	RF AGC	TV broadcast	E-E	TV screen	VR611	1. Turn VR611 in the direction which causes snow to appear, then in the opposite direction until the snow just disappears.

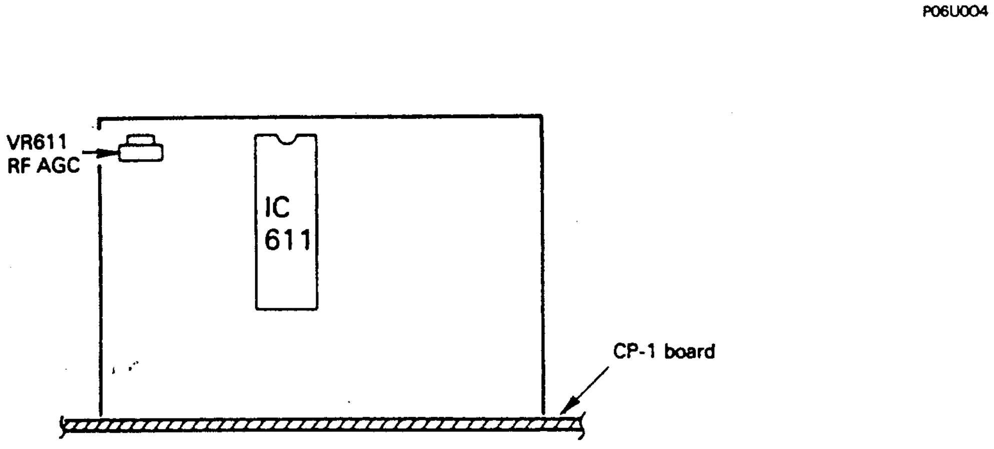


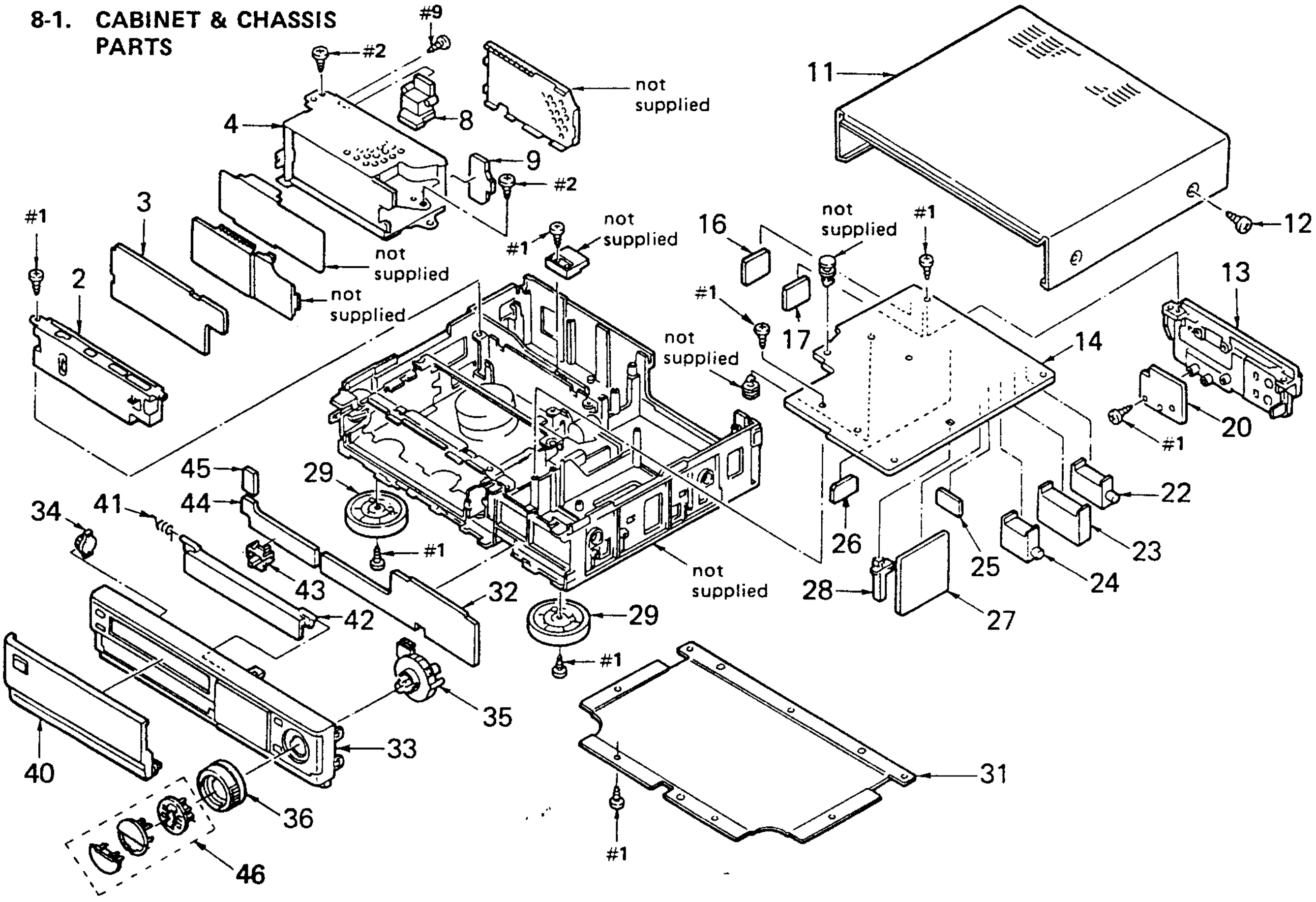
Fig. 2-5-1 VIF unit (Parts side view)

SECTION 8
EXPLODED VIEWS

NOTE:
- –XX, –X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ Parts color ↑ Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

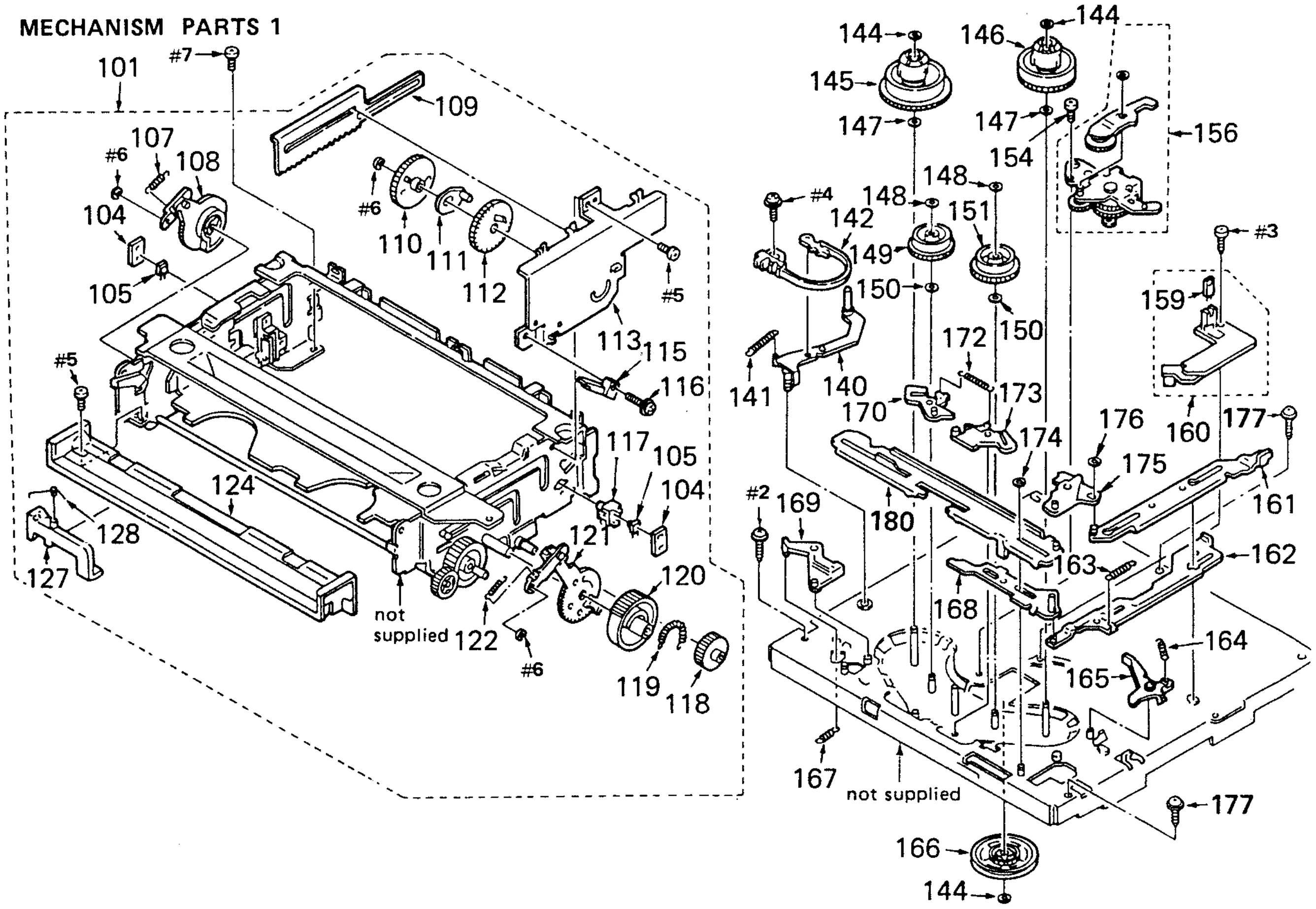
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

8-1. CABINET & CHASSIS PARTS



Ref. No.	Part No.	Description	Remark
* 2	A-6756-453-A	VP-1 BOARD, COMPLETE	
* 3	A-6756-454-A	VD-2 BOARD, COMPLETE	
* 4	A-6756-459-A	PW-1 BOARD, COMPLETE	
* 8	A-6756-461-A	PW-3 BOARD, COMPLETE	
* 9	A-6756-460-A	PW-2 BOARD, COMPLETE	
* 11	3-947-426-01	COVER, TOP	
12	3-740-382-01	+BTS-B S 4X12	
13	1-694-007-11	TERMINAL	
* 14	A-6756-442-A	CP-A BOARD, COMPLETE	
* 16	A-6756-450-A	TM-5 BOARD, COMPLETE	
* 17	A-6756-451-A	TM-9 BOARD, COMPLETE	
* 20	A-6756-448-A	TB-1 BOARD, COMPLETE	
22	1-466-718-11	MODULATOR, RF	
23	1-466-522-11	IF PACK	
24	1-465-748-11	TUNER PACK	
25	A-6756-498-A	TN-7 BOARD, COMPLETE	
* 26	A-6756-452-A	VD-1 BOARD, COMPLETE	
* 27	A-6756-449-A	AD-1 BOARD, COMPLETE	
* 28	3-940-518-01	HOLDER (NAP PCB)	
29	3-947-402-01	STAND (SLV-X700)	
29	3-949-130-01	STAND (SLV-526MK)	
* 31	3-947-408-01	COVER, BOTTOM	
* 32	A-6756-455-A	TM-1 BOARD, COMPLETE	
33	A-6704-607-A	CABINET ASSY, FRONT (SLV-X700)	
33	A-6704-642-A	CABINET ASSY, FRONT (SLV-526MK)	
34	3-947-389-01	DAMPER	
35	1-572-662-11	SWITCH, ROTARY	
36	3-944-572-01	RING, SHUTTLE	
40	A-6704-608-A	DOOR ASSY, FRONT (SLV-X700)	
40	A-6704-643-A	DOOR ASSY, FRONT (SLV-526MK)	
41	3-942-659-01	SPRING (CASSETTE DOOR)	
42	3-947-409-01	DOOR, CASSETTE	
43	3-947-414-01	KNOB, SLIDE	
* 44	A-6756-456-A	TM-2 BOARD, COMPLETE	
* 45	A-6756-457-A	TM-3 BOARD, COMPLETE	
46	X-3941-453-1	BOTTON ASSY, FUNCTION (SLV-X700)	
46	X-3941-791-1	BOTTON ASSY, FUNCTION (SLV-526MK)	

8-2. MECHANISM PARTS 1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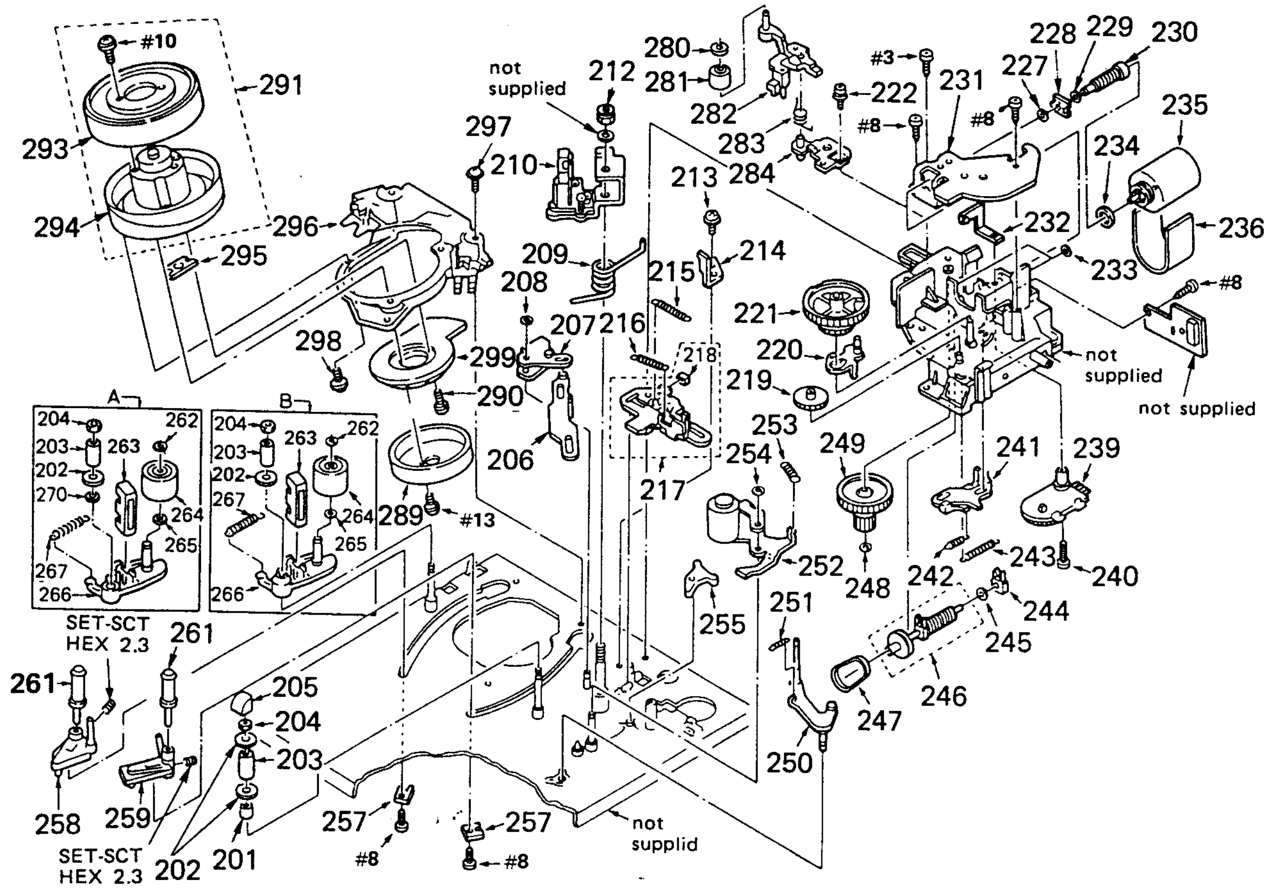
Ref. No.	Part No.	Description	Remark
* 101	A-6773-687-A	MECHANICAL ASSY, CASSETTE	
104	3-735-734-01	LID	
105	1-808-710-11	PHOTO TRANSISTORPN150SAN	
107	3-735-720-01	SPRING	
108	3-735-719-01	LEVER (L) ASSY, GEAR	
109	3-740-344-01	LOCK	
110	3-735-731-01	GEAR, LOCK	
111	3-735-732-01	LEVER ASSY, PINION	
112	3-735-730-01	GEAR, PINION	
113	3-740-342-01	BRACKET, GEAR	
115	3-735-729-01	SW, LEAF	
116	3-735-775-01	SCREW (2X9), +PSW	
* 117	3-940-408-01	HOLDER, TRANSISTOR	
118	3-735-728-01	GEAR, IDLER	
119	3-735-725-01	SPRING	
120	3-735-724-01	GEAR, MAIN	
121	3-735-723-01	GEAR ASSY, LEVER	
122	3-735-726-01	SPRING	
124	3-735-716-01	FRAME, LOWER	
127	3-942-686-01	LEVER, SAFETY SWITCH	
128	3-942-688-01	SPRING, SAFETY SWITCH	
140	3-740-352-01	LEVER, TENSION	
141	3-735-654-01	SPRING	
142	3-735-690-01	HOLDER ASSY, BAND	
144	3-735-755-01	WASHER (DIA. 2.6)	
145	3-948-507-01	REEL (SUPPLY) (ASSY)	
146	3-948-506-01	REEL (TAKE-UP) (ASSY)	
147	3-735-754-01	WASHER (DIA. 3), ADJUSTMENT	
148	3-741-401-01	WASHER Y 2.1X6X0.25	
149	3-947-391-01	GEAR, REEL SUPPLY	
150	3-735-750-01	WASHER (DIA. 2.6), SPECIAL	
151	3-947-392-01	GEAR, REEL TAKE-UP	
154	3-942-657-01	SCREW (2.6X4), SPECIAL	
156	3-735-625-01	CLUTCH ASSY, IDLER	
159	1-808-722-11	DIODE LN59 (RED)	
* 160	A-6756-374-A	MC-4 BOARD, COMPLETE	
* 161	3-735-662-01	PLATE ASSY, SLIDE	
* 162	3-735-626-01	BRAKE (C) ASSY	
163	3-735-627-01	SPRING	
164	3-735-665-01	SPRING	
165	3-740-349-01	SPRING	
166	3-947-393-01	PULLEY, REEL	
167	3-740-348-01	SPRING	
* 168	3-735-628-01	BRAKE, SLIDE ACT	
169	3-735-655-01	BRAKE SUB, S	
170	3-735-656-01	BRAKE ASSY, S	
172	3-735-658-01	SPRING	
173	3-946-515-01	BRAKE (ASSY), TAKE-UP	
174	3-735-761-01	WASHER (DIA. 2.6)	
175	3-735-663-01	LEVER, CONTROL	
176	3-746-725-01	WASHER, SPECIAL	
177	3-735-345-11	SCREW (4X12), +T TP	
* 180	3-735-661-01	PLATE ASSY, SLIDE	

8-3. MECHANISM PARTS 2



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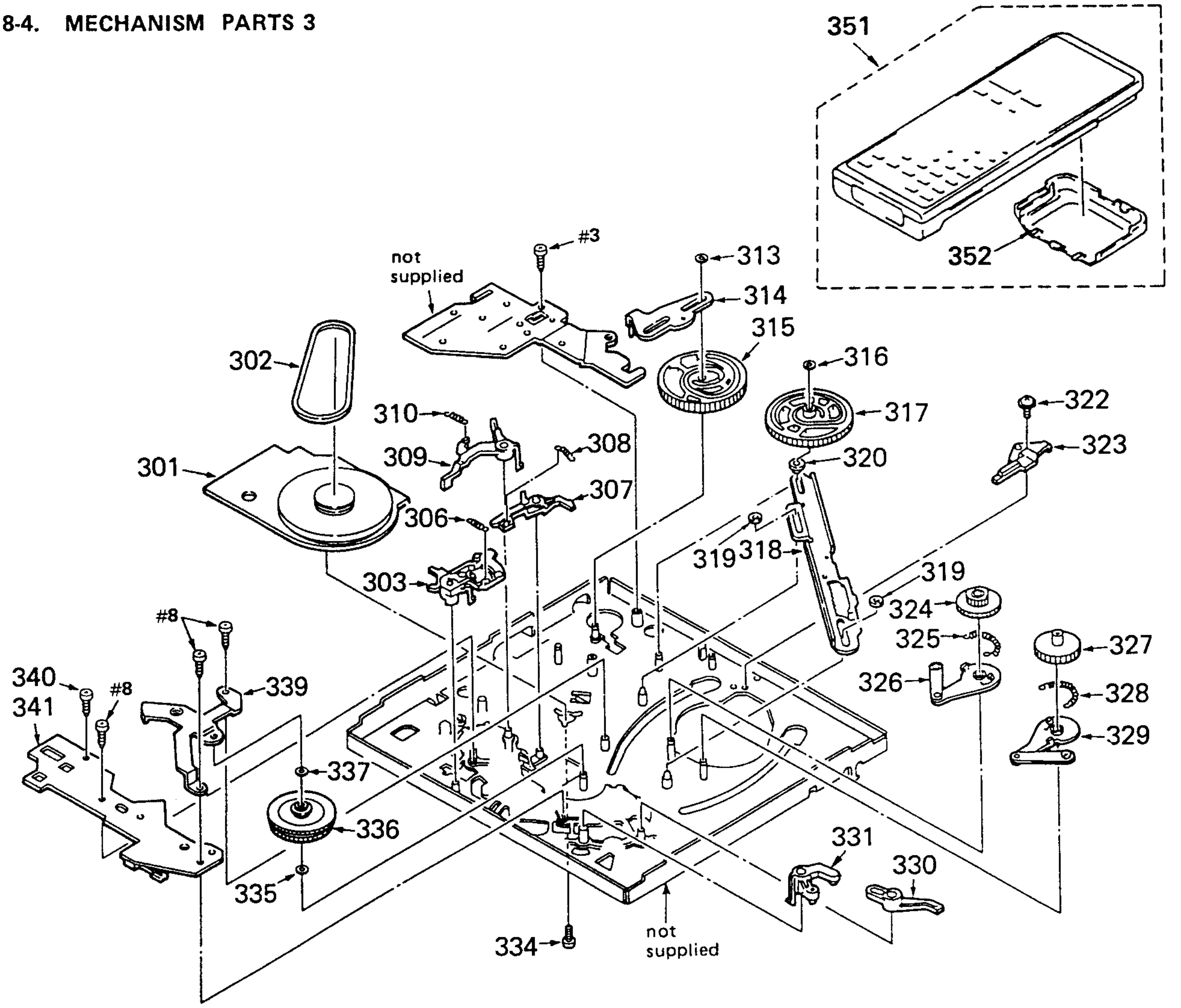
Ref. No.	Part No.	Description	Remark
201	3-942-673-01	SLEEVE	
202	3-741-408-01	WASHER, SPECIAL	
203	3-942-674-01	GUIDE, TAPE	
204	3-948-510-01	NUT (DIA. 3), SPECIAL	
205	3-943-187-01	CAP	
* 206	3-735-672-01	SLIDE ASSY, PINCH	
* 207	3-735-673-01	PINCH LEVER ASSY	
208	3-735-759-01	WASHER (DIA. 3)	
209	3-735-680-01	SPRING	
210	3-735-679-01	BRACKET, COMPL	
212	3-735-682-01	NUT (M5), SPECIAL	
213	3-741-410-01	SCR PAN+SE+W 2.6X5	
214	3-942-071-01	STOPPER, BRACKET	
215	3-735-669-01	SPRING	
216	3-735-670-01	SPRING	
217	3-735-667-01	CAM ASSY, SLIDE	
218	3-735-668-01	DAMPER	
219	3-735-704-01	GEAR	
220	3-740-366-01	LEVER, FRONT	
221	3-735-703-01	GEAR (F), HELICAL	
222	3-741-414-01	SCR PAN+SW+W 2.6X6	
227	3-741-412-01	WASHER, SPECIAL	
228	3-735-696-01	HOLDER, WORM	
229	3-740-357-01	WASHER	
230	3-735-706-01	WORM ASSY, F	
231	3-740-356-01	BRACKET, HOLDER	
232	3-740-354-01	PLATE, NUT	
233	3-701-441-21	WASHER (DIA. 4)	
234	3-735-708-01	DAMPER, WORM	
235	3-735-707-01	MOTOR ASSY, L	
236	3-740-358-01	DAMPER, MOTOR	
239	1-572-383-11	SWITCH, ROTARY	
240	3-741-411-01	SCR PAN 2.6X13	
241	3-740-362-01	SLIDE, FRONT	
242	3-740-363-01	SPRING	
243	3-740-364-01	SPRING	
244	3-735-696-01	HOLDER, WORM	
245	3-735-774-01	WASHER (DIA. 2)	
246	3-740-359-01	LOAD WORM	
247	3-735-709-01	BELT (LOADING)	
248	3-735-756-01	WASHER (DIA. 3)	
249	3-740-361-01	GEAR, HELICAL	
250	3-749-023-01	GUIDE (REV), LEVER ASSY	
251	3-735-660-01	SPRING	
252	3-735-674-01	PINCH ROLLER, COMPL	
253	3-735-675-01	SPRING	
254	3-735-757-01	WASHER (DIA. 3.6)	
255	3-735-671-01	LEVER, ACT BRAKE	
257	3-735-631-01	PLATE, GUIDE	
258	3-735-629-01	ROLLER (S) ASSY, BASE	
259	3-735-632-01	ROLLER (T) ASSY, BASE	
261	3-735-630-01	ROLLER ASSY, GUIDE	
262	3-735-767-01	WASHER SPECIAL	
263	3-735-687-01	HEAD, FTE	
264	3-735-685-01	ROLLER, IMPEDANCE	
265	3-735-771-01	WASHER (DIA. 2), SPECIAL	
* 266	3-735-684-01	LEVER ASSY, FE HEAD	
267	3-735-686-01	SPRING	
270	3-735-770-01	WASHER (DIA.6)	
280	3-735-758-01	WASHER (DIA. 2.6)	
281	3-944-844-01	CLEANER ASSY, ROLLER	
282	3-942-090-01	LEVER ASSY, CLEANER	
283	3-942-069-01	SPRING	
284	3-942-089-01	BRACKET ASSY, CLEANER	
288	3-735-778-01	SCREW (2.3X6) +PSW	
* 289	1-461-017-11	ROTOR	
290	3-741-416-01	SCR PAN+SW+W 2.3X10	
291	A-6050-719-A	2N4P CYLINDER BOARD, COMPLETE	
292	3-735-776-01	SCREW (3X8), +PW	
293	3-749-150-01	CYLINDER (UPR 2N4P)	
294	3-746-722-01	CYLINDER (LWR4)	
295	3-735-738-01	SPACER, MOTOR	
* 296	3-735-737-01	CYLINDER BASE	
297	3-740-398-01	SCR PAN+FLG 3X6	
298	3-740-370-01	SCREW (2.6X8), SPECIAL	
299	1-462-284-11	STATOR	

8-4. MECHANISM PARTS 3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Ref. No.	Part No.	Description	Remark
301	3-947-431-01	MOTOR, CAPSTAN	
302	3-946-511-01	BELT, REEL DRIVE	
303	3-735-644-01	CLUTCH ASSY, LEVER	
306	3-735-646-01	SPRING	
307	3-735-647-01	LEVER, CONVERSION CLUTCH	
308	3-735-648-01	SPRING	
309	3-735-649-01	BRAKE ASSY, CAP	
310	3-741-405-01	CAPSTAN, SPRING	
313	3-735-759-01	WASHER (DIA 3)	
* 314	3-735-643-01	PLATE ASSY, CAM	
315	3-735-639-01	CAM, MODE	
316	3-735-756-01	WASHER (DIA 3)	
317	3-947-406-01	CAM, MAIN	
318	3-948-513-01	RACK, LOAD	
319	3-735-758-01	WASHER (DIA 2.6)	
320	3-735-758-01	WASHER (DIA 2.6)	
322	7-682-903-01	SCREW (3X4), +PWH	
323	3-735-693-01	PLATE ASSY, GROUND	
324	3-735-638-01	GEAR (T)	
325	3-735-637-01	SPRING (T)	
326	3-735-636-01	LOAD (T) ASSY, LEVER	
327	3-735-635-01	GEAR (S)	
328	3-735-634-01	SPRING	
329	3-735-633-01	LOAD (S) ASSY, LEVER	
330	3-735-766-01	LEVER, RETURN TENSION	
331	3-740-368-01	CONTROL ASSY, LEVER	
334	3-740-355-01	SCREW (+P) (2.6X5)	
335	3-735-760-01	WASHER (DIA 3), SPECIAL	
336	3-735-651-01	GEAR ASSY, FRICTION	
337	3-735-755-01	WASHER (DIA 2.6)	
339	3-740-397-01	BRACKET PULLEY	
340	3-740-396-01	SCR STPG BIN 2.6X5	
* 341	A-6756-462-A	MC-1 BOARD, COMPLETE	
* 341	1-589-219-11	MC-1 BOARD	
341-1	1-571-931-11	SWITCH, LEAF (FRONT LOADING) (MC-1)	
341-2	1-571-932-11	SWITCH, LEAF (ERASURE-PREVENSION)(MC-1)	
341-3	1-808-723-11	PHOTO COUPLER (T REEL SENSOR) (MC-1)	
341-4	3-735-744-01	SPACER, PHOTO SENSOR (MC-1)	
351	1-693-152-11	REMOTE CONTRPL (RMT-V121)	
352	3-943-535-01	COVER, BATTERY	

SECTION 9
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description				Remark
*	A-6756-449-A	AD-1 BOARD, COMPLETE				
		*********************				
		< CAPACITOR >				
C2001	1-126-301-11	ELECT	1uF	20%	50V	
C2002	1-162-293-31	CERAMIC	820PF	10%	50V	
C2004	1-124-034-51	ELECT	33uF	20%	16V	
C2005	1-161-053-00	CERAMIC	0.015uF	10%	50V	
C2006	1-124-465-00	ELECT	0.47uF	20%	50V	
C2008	1-161-327-00	CERAMIC	0.0033uF	30%	50V	
C2009	1-124-126-00	ELECT	47uF	20%	10V	
C2010	1-126-096-11	ELECT	10uF	20%	35V	
C2013	1-161-053-00	CERAMIC	0.015uF	10%	50V	
C2016	1-124-791-11	ELECT	1.0uF	20%	100V	
C2017	1-124-034-51	ELECT	33uF	20%	16V	
C2018	1-126-163-11	ELECT	4.7uF	20%	50V	
C2019	1-124-589-11	ELECT	47uF	20%	16V	
C2020	1-162-286-31	CERAMIC	220PF	10%	50V	
C2021	1-130-309-00	FILM	0.033uF	5%	100V	
C2022	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C2024	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C2025	1-161-494-00	CERAMIC	0.022uF		25V	
C2042	1-161-021-11	CERAMIC	0.047uF	10%	25V	
C2045	1-161-327-00	CERAMIC	0.0033uF	20%	50V	
C2071	1-162-286-31	CERAMIC	220PF	10%	50V	
C2072	1-124-791-11	ELECT	1.0uF	20%	100V	
C2073	1-161-053-00	CERAMIC	0.015uF	10%	50V	
		< DIODE >				
D2101	8-719-911-19	DIODE 1SS119				
D2102	8-719-911-19	DIODE 1SS119				
D2103	8-719-911-19	DIODE 1SS119				
D2104	8-719-911-19	DIODE 1SS119				
		< IC >				
IC201	1-808-746-11	IC LA7295				
		< COIL >				
L2002	1-412-820-11	HF CHOKE	6800uH			
L2003	1-412-819-11	HF CHOKE	560uH			
		< TRANSISTOR >				
Q2001	8-729-873-40	TRANSISTOR	2SD734-E			
Q2041	8-729-900-89	TRANSISTOR	DTC144ES			
Q2101	8-729-907-34	TRANSISTOR	2SD1468S-S			
Q2102	8-729-907-34	TRANSISTOR	2SD1468S-S			
Q2103	8-729-900-89	TRANSISTOR	DTC144ES			
		< TRANSFORMER >				
T2001	1-406-366-11	COIL, OSC				
		< VARIABLE RESISTOR >				
VR201	1-228-997-00	RES, ADJ, METAL 100K				

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Ref. No.	Part No.	Description				Remark
*	A-6756-442-A	CP-A BOARD, COMPLETE				
		*********************				
	1-575-925-11	CORD				
		< CAPACITOR >				
C1001	1-126-157-11	ELECT	10uF	20%	16V	
C1002	1-162-816-11	CERAMIC	180PF	10%	50V	
C1003	1-164-073-11	CERAMIC	100PF		50V	
C1004	1-124-768-11	ELECT	4.7uF	20%	50V	
C1005	1-162-195-31	CERAMIC	4.7PF	10%	50V	
C1006	1-162-289-31	CERAMIC	390PF	10%	50V	
C1007	1-162-209-31	CERAMIC	27PF	5%	50V	
C1008	1-162-196-31	CERAMIC	5.6PF	10%	50V	
C1009	1-162-280-31	CERAMIC	82PF	10%	50V	
C1010	1-126-157-11	ELECT	10uF	20%	16V	
C1011	1-126-157-11	ELECT	10uF	20%	16V	
C1012	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C1013	1-161-057-00	CERAMIC	0.033uF	10%	50V	
C1014	1-161-494-00	CERAMIC	0.022uF		25V	
C1015	1-126-301-11	ELECT	1uF	20%	50V	
C1016	1-161-021-11	CERAMIC	0.047uF	10%	25V	
C1017	1-126-301-11	ELECT	1uF	20%	50V	
C1018	1-161-494-00	CERAMIC	0.022uF		25V	

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Ref. No.	Part No.	Description			Remark
C1019	1-101-890-00	CERAMIC	75PF	5%	50V
C1020	1-126-301-11	ELECT	1uF	20%	50V
C1021	1-124-258-11	ELECT	3.3uF	20%	50V
C1022	1-161-494-00	CERAMIC	0.022uF		25V
C1023	1-161-494-00	CERAMIC	0.022uF		25V
C1024	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1025	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1026	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1027	1-126-157-11	ELECT	10uF	20%	16V
C1028	1-126-157-11	ELECT	10uF	20%	16V
C1029	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1030	1-126-157-11	ELECT	10uF	20%	16V
C1031	1-161-772-11	CERAMIC	0.1uF	10%	25V
C1032	1-126-154-11	ELECT	47uF	20%	6.3V
C1033	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1034	1-126-154-11	ELECT	47uF	20%	6.3V
C1035	1-162-205-31	CERAMIC	18PF	5%	50V
C1036	1-162-219-31	CERAMIC	68PF		50V
C1037	1-162-290-31	CERAMIC	470PF		50V
C1038	1-162-209-31	CERAMIC	27PF		50V
C1051	1-162-199-11	CERAMIC	10PF	5%	50V
C1052	1-162-212-11	CERAMIC	36PF	5%	50V
C1053	1-164-060-11	CERAMIC	39PF	5%	50V
C1054	1-162-209-31	CERAMIC	27PF	5%	50V
C1055	1-164-064-11	CERAMIC	56PF	5%	50V
C1056	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1057	1-126-157-11	ELECT	10uF	20%	16V
C1058	1-162-208-11	CERAMIC	24PF		50V
C1101	1-126-301-11	ELECT	1uF	20%	50V
C1102	1-126-163-11	ELECT	4.7uF	20%	50V
C1103	1-162-290-31	CERAMIC	470PF	10%	50V
C1104	1-124-465-00	ELECT	0.47uF	20%	50V
C1105	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1106	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1107	1-101-880-00	CERAMIC	47PF	5%	50V
C1108	1-162-195-31	CERAMIC	4.7PF	10%	50V
C1109	1-101-880-00	CERAMIC	47PF	5%	50V
C1110	1-162-207-31	CERAMIC	22PF	5%	50V
C1111	1-162-816-11	CERAMIC CHIP	180PF	5%	50V
C1112	1-162-280-31	CERAMIC	82PF	10%	50V
C1113	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1114	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1115	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1116	1-124-589-11	ELECT	47uF	20%	16V
C1117	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1119	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1120	1-126-163-11	ELECT	4.7uF	20%	50V
C1151	1-164-068-11	CERAMIC	82PF	5%	50V

Ref. No.	Part No.	Description			Remark
C1152	1-162-219-31	CERAMIC	68PF	5%	50V
C1161	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1162	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1163	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1164	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1165	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1166	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1167	1-162-207-31	CERAMIC	22PF	5%	50V
C1168	1-162-207-31	CERAMIC	22PF	5%	50V
C1169	1-162-209-31	CERAMIC	27PF	5%	50V
C1201	1-161-494-00	CERAMIC	0.022uF		25V
C1202	1-102-976-11	CERAMIC	180PF		50V
C1203	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1204	1-126-157-11	ELECT	10uF	20%	16V
C1211	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1212	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1213	1-162-290-31	CERAMIC	470PF	10%	50V
C1214	1-162-219-31	CERAMIC	68PF	5%	50V
C1216	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1217	1-162-219-31	CERAMIC	68PF	5%	50V
C1218	1-162-280-31	CERAMIC	82PF	10%	50V
C1219	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1220	1-126-301-11	ELECT	1uF	20%	50V
C1251	1-164-064-11	CERAMIC	56PF	5%	50V
C1252	1-101-880-00	CERAMIC	47PF	5%	50V
C1253	1-164-072-11	CERAMIC	120PF	5%	50V
C1254	1-162-287-31	CERAMIC	270PF	10%	50V
C1255	1-162-816-11	CERAMIC CHIP	180PF	5%	50V
C1256	1-162-280-31	CERAMIC	82PF	10%	50V
C1261	1-162-284-31	CERAMIC	150PF	10%	50V
C1262	1-162-289-31	CERAMIC	390PF	10%	50V
C1263	1-162-203-31	CERAMIC	15PF	5%	50V
C1264	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1301	1-126-154-11	ELECT	47uF	20%	6.3V
C1302	1-126-154-11	ELECT	47uF	20%	6.3V
C1303	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1304	1-126-154-11	ELECT	47uF	20%	6.3V
C1311	1-124-472-11	ELECT	470uF	20%	10V
C1312	1-124-248-00	ELECT	22uF	20%	35V
C1313	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1314	1-124-589-11	ELECT	47uF	20%	16V
C1321	1-126-154-11	ELECT	47uF	20%	6.3V
C1322	1-126-154-11	ELECT	47uF	20%	6.3V
C1323	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1324	1-126-154-11	ELECT	47uF	20%	6.3V
C1331	1-162-207-31	CERAMIC	22PF	5%	50V
C1332	1-162-207-31	CERAMIC	22PF	5%	50V
C1333	1-162-207-31	CERAMIC	22PF	5%	50V
C1351	1-124-234-00	ELECT	22uF	20%	16V

Ref. No.	Part No.	Description			Remark
C1361	1-126-301-11	ELECT	1uF	20%	50V
C1371	1-124-238-11	ELECT	4.7uF		25V
C1401	1-130-471-00	MYLAR	0.001uF	5%	50V
C1402	1-130-477-00	MYLAR	0.0033uF	5%	50V
C1403	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1404	1-161-772-11	CERAMIC	0.1uF	10%	25V
C1405	1-130-470-00	MYLAR	820PF	5%	50V
C1406	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1407	1-101-880-00	CERAMIC	47PF	5%	50V
C1408	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1409	1-164-064-11	CERAMIC	56PF	5%	50V
C1410	1-164-064-11	CERAMIC	56PF	5%	50V
C1411	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1412	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1413	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1414	1-126-154-11	ELECT	47uF	20%	6.3V
C1421	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1432	1-102-820-00	CERAMIC	330PF	5%	50V
C1433	1-162-205-31	CERAMIC	18PF	5%	50V
C3001	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3002	1-126-155-11	ELECT	100uF	20%	6.3V
C3003	1-124-234-00	ELECT	22uF	20%	16V
C3004	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3005	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3006	1-162-203-31	CERAMIC	15PF	5%	50V
C3007	1-162-207-31	CERAMIC	22PF	5%	50V
C3013	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3016	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3017	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3018	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3019	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3021	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3022	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3023	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3024	1-126-157-11	ELECT	10uF	20%	16V
C3025	1-126-157-11	ELECT	10uF	20%	16V
C3026	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3027	1-124-257-00	ELECT	2.2uF	20%	50V
C3028	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3029	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3501	1-161-055-00	CERAMIC	0.022uF	10%	50V
C3503	1-162-286-31	CERAMIC	220PF	10%	50V
C3504	1-161-044-00	CERAMIC	0.0027uF	10%	50V
C3505	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3506	1-161-055-00	CERAMIC	0.022uF	10%	50V
C3507	1-161-061-11	CERAMIC	0.068uF	10%	50V
C3509	1-162-288-31	CERAMIC	330PF	10%	50V
C3512	1-126-154-11	ELECT	47uF	20%	6.3V
C3513	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3514	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C3515	1-126-157-11	ELECT	10uF	20%	16V
C3516	1-126-162-11	ELECT	3.3uF	20%	50V
C3517	1-162-292-31	CERAMIC	680PF	10%	50V
C3518	1-124-034-51	ELECT	33uF	20%	16V
C3519	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3520	1-137-556-11	MT-POLYEST	0.033uF 50V		
C3521	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3522	1-126-154-11	ELECT	47uF	20%	6.3V
C3524	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3525	1-126-301-11	ELECT	1uF	20%	50V
C3526	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C3527	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3528	1-124-464-11	ELECT	0.22uF	20%	50V
C3529	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3530	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3951	1-130-728-00	FILM	0.0022uF	5%	50V
C3952	1-126-301-11	ELECT	1uF	20%	50V
C3953	1-126-154-11	ELECT	47uF	20%	6.3V
C3954	1-161-494-00	CERAMIC	0.022uF		25V
C3955	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3956	1-126-301-11	ELECT	1uF	20%	50V
C5401	1-161-379-00	CERAMIC	0.01uF	20%	25V
C5402	1-126-154-11	ELECT	47uF	20%	6.3V
C5403	1-161-379-00	CERAMIC	0.01uF	20%	25V
C6001	1-161-063-00	CERAMIC	0.1uF	10%	50V
C6002	1-126-163-11	ELECT	4.7uF	20%	50V
C6003	1-126-301-11	ELECT	1uF	20%	50V
C6004	1-136-165-00	FILM	0.1uF	5%	50V
C6005	1-126-163-11	ELECT	4.7uF	20%	50V
C6006	1-124-455-00	ELECT	100uF	20%	16V
C6007	1-101-006-00	CERAMIC	0.047uF		50V
C6009	1-124-916-11	ELECT	22uF	20%	63V
C6010	1-161-063-00	CERAMIC	0.1uF	10%	50V
C6018	1-161-379-00	CERAMIC	0.01uF	20%	25V
C6019	1-161-379-00	CERAMIC	0.01uF	20%	25V
C6020	1-124-916-11	ELECT	22uF	20%	63V
C6601	1-126-155-11	ELECT	100uF	20%	6.3V
C6602	1-126-155-11	ELECT	100uF	20%	6.3V
C6604	1-161-379-00	CERAMIC	0.01uF	20%	25V
C6605	1-161-379-00	CERAMIC	0.01uF	20%	25V
C6606	1-161-379-00	CERAMIC	0.01uF	20%	25V
C6608	1-126-301-11	ELECT	1uF	20%	50V
		< DIODE >			
D1001	8-719-912-20	DIODE	1SS120		
D1002	8-719-912-20	DIODE	1SS120		
D1003	8-719-912-20	DIODE	1SS120		
D1004	8-719-912-20	DIODE	1SS120		

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Ref. No.	Part No.	Description	Remark
D1005	8-719-912-20	DIODE 1SS120	
D1006	8-719-912-20	DIODE 1SS120	
D1007	8-719-912-20	DIODE 1SS120	
D1008	8-719-912-20	DIODE 1SS120	
D1101	8-719-110-13	DIODE RD9.1ES-B2	
D1151	8-719-912-20	DIODE 1SS120	
D1152	8-719-912-20	DIODE 1SS120	
D1201	8-719-912-20	DIODE 1SS120	
D1202	8-719-912-20	DIODE 1SS120	
D1301	8-719-109-89	DIODE RD5.6ES-B2	
D1311	8-719-912-20	DIODE 1SS120	
D1312	8-719-912-20	DIODE 1SS120	
D1313	8-719-912-20	DIODE 1SS120	
D1361	8-719-912-20	DIODE 1SS120	
D1362	8-719-912-20	DIODE 1SS120	
D1363	8-719-912-20	DIODE 1SS120	
D1364	8-719-912-20	DIODE 1SS120	
D1371	8-719-912-20	DIODE 1SS120	
D1372	8-719-912-20	DIODE 1SS120	
D1373	8-719-912-20	DIODE 1SS120	
D1374	8-719-912-20	DIODE 1SS120	
D1391	8-719-912-20	DIODE 1SS120	
D1392	8-719-912-20	DIODE 1SS120	
D1393	8-719-912-20	DIODE 1SS120	
D3010	8-719-912-20	DIODE 1SS120	
D3021	8-719-110-08	DIODE RD8.2ES-B2	
D3022	8-719-109-89	DIODE RD5.6ES-B2	
D3023	8-719-912-20	DIODE 1SS120	
D3025	8-719-912-20	DIODE 1SS120	
D3501	8-719-912-20	DIODE 1SS120	
D3504	8-719-912-20	DIODE 1SS120	
D3505	8-719-912-20	DIODE 1SS120	
D3951	8-719-912-20	DIODE 1SS120	
D3952	8-719-912-20	DIODE 1SS120	
D3953	8-719-912-20	DIODE 1SS120	
D5401	8-719-912-20	DIODE 1SS120	
D5402	8-719-921-44	DIODE MTZJ-5.1C	
D5403	8-719-109-97	DIODE RD6.8ES-B2	
D5404	8-719-901-83	DIODE 1SS83	
D5406	8-719-109-68	DIODE RD3.6ES-B1	
D5408	8-719-923-33	DIODE MTZJ5.1A-T-77	
D5411	1-809-070-11	DIODE AK04-V2	
D6002	1-809-070-11	DIODE AK04-V2	
D6601	8-719-912-20	DIODE 1SS120	
		< DELAY LINE >	
DL101	1-415-899-11	DELAY, 2H	
DL102	1-415-830-11	DELAY 1H 4.43NTSC	
DL103	1-415-900-11	DELAY, 1H	

Ref. No.	Part No.	Description	Remark
		< IC >	
IC101	1-809-674-11	IC LA7395	
IC102	8-759-821-51	IC LC8992	
IC104	1-809-230-11	IC M52063SP	
IC105	8-759-927-56	IC BA7021	
IC106	8-759-927-56	IC BA7021	
IC301	1-809-751-11	IC uPD78138GF-012-3B9	
IC302	8-759-403-44	IC MN1280-S	
IC303	8-759-822-09	IC LB1641	
IC352	1-809-033-11	IC LA7124	
IC391	8-759-514-54	IC BA7046	
IC601	8-759-157-40	IC uPC574J	
		< COIL >	
L1001	1-410-322-11	INDUCTOR 3.3uH	
L1002	1-412-818-11	INDUCTOR 150uH	
L1051	1-410-522-11	INDUCTOR 120uH	
L1052	1-410-515-11	INDUCTOR 33uH	
L1053	1-410-519-41	INDUCTOR 68uH	
L1054	1-410-519-41	INDUCTOR 68uH	
L1101	1-410-316-11	INDUCTOR 1uH	
L1102	1-410-520-11	INDUCTOR 82uH	
L1161	1-410-511-11	INDUCTOR 15uH	
L1163	1-410-515-11	INDUCTOR 33uH	
L1164	1-410-515-11	INDUCTOR 33uH	
L1165	1-410-516-11	INDUCTOR 39uH	
L1201	1-410-515-11	INDUCTOR 33uH	
L1211	1-410-524-11	INDUCTOR 180uH	
L1212	1-410-525-11	INDUCTOR 220uH	
L1213	1-410-525-11	INDUCTOR 220uH	
L1251	1-410-507-11	INDUCTOR 6.8uH	
L1252	1-410-513-11	INDUCTOR 22uH	
L1253	1-410-520-11	INDUCTOR 82uH	
L1254	1-410-519-11	INDUCTOR 68uH	
L1261	1-410-522-11	INDUCTOR 120uH	
L1262	1-412-815-11	INDUCTOR 2.2uF	
L1432	1-410-512-11	INDUCTOR 18uH	
L1433	1-410-515-11	INDUCTOR 33uH	
L6033	1-410-509-11	INDUCTOR 10uH	
L6601	1-408-411-00	INDUCTOR 15uH	
L6602	1-408-411-00	INDUCTOR 15uH	
		< TRANSISTOR >	
Q1001	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1002	8-729-900-89	TRANSISTOR DTC144ES	
Q1003	8-729-900-89	TRANSISTOR DTC144ES	
Q1004	8-729-900-65	TRANSISTOR DTA144ES	
Q1005	8-729-900-89	TRANSISTOR DTC144ES	

Ref. No.	Part No.	Description	Remark
Q1006	8-729-900-89	TRANSISTOR DTC144ES	
Q1051	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1052	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1053	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1054	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1055	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1101	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1102	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1103	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1104	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1105	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1151	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1152	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1161	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1162	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1163	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1202	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1211	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1212	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1213	8-729-900-65	TRANSISTOR DTA144ES	
Q1215	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1251	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1252	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1261	8-729-900-89	TRANSISTOR DTC144ES	
Q1262	8-729-900-89	TRANSISTOR DTC144ES	
Q1301	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1311	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1312	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1331	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1332	8-729-900-89	TRANSISTOR DTC144ES	
Q1351	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q1352	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1361	8-729-900-89	TRANSISTOR DTC144ES	
Q1362	8-729-900-80	TRANSISTOR DTC114ES	
Q1363	8-729-900-80	TRANSISTOR DTC114ES	
Q1364	8-729-900-65	TRANSISTOR DTA144ES	
Q1371	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1372	8-729-900-89	TRANSISTOR DTC144ES	
Q1381	8-729-900-89	TRANSISTOR DTC144ES	
Q1382	8-729-900-63	TRANSISTOR DTA124ES	
Q1383	8-729-900-65	TRANSISTOR DTA144ES	
Q1391	8-729-900-89	TRANSISTOR DTC144ES	
Q1392	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1393	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1401	8-729-900-89	TRANSISTOR DTC144ES	
Q1421	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q3001	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q3002	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q3007	8-729-900-80	TRANSISTOR DTC114ES	
Q3023	8-729-900-80	TRANSISTOR DTC114ES	
Q3024	8-729-900-80	TRANSISTOR DTC114ES	
Q3501	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q3601	8-729-900-89	TRANSISTOR DTC144ES	
Q3952	8-729-266-83	TRANSISTOR 2SC2668	
Q3953	8-729-900-89	TRANSISTOR DTC144ES	
Q5401	8-729-205-95	TRANSISTOR 2SA1428-Y	
Q5402	8-729-205-95	TRANSISTOR 2SA1428-Y	
Q5403	8-729-140-97	TRANSISTOR 2SB734-34	
Q6001	1-809-685-11	TRANSISTOR 2SK1104-P	
Q6002	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q6004	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6005	8-729-900-61	TRANSISTOR DTA114ES	
Q6008	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6009	8-729-900-80	TRANSISTOR DTC114ES	
Q6010	8-729-900-80	TRANSISTOR DTC114ES	
Q6602	8-729-900-61	TRANSISTOR DTA114ES	
Q6603	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6604	8-729-800-81	TRANSISTOR 2SB808-F1	
Q6605	8-729-900-61	TRANSISTOR DTA114ES	
Q6606	8-729-900-80	TRANSISTOR DTC114ES	

< RESISTOR >

Ref. No.	Part No.	Description	Remark
R3054	1-260-039-11	CARBON 1.5M JA	
R3061	1-260-039-11	CARBON 1.5M JA	
⚠R3064	1-212-946-00	FUSIBLE 3.3 5% 1/2W	F
R3952	1-214-780-00	METAL 130K 1% 1/4W	
⚠R5404	1-212-897-00	FUSIBLE 470 5% 1/4W	F

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description	Remark
VR101	1-228-995-00	RES, ADJ, METAL 22K	
VR102	1-228-995-00	RES, ADJ, METAL 22K	
VR103	1-228-995-00	RES, ADJ, METAL 22K	
VR104	1-228-994-00	RES, ADJ, METAL 10K	
VR120	1-228-994-00	RES, ADJ, METAL 10K	
VR181	1-228-991-00	RES, ADJ, METAL 2.2K	
VR182	1-241-887-11	VR. SEMI 1.5KB	
VR351	1-228-998-00	RES, ADJ, METAL 220K	

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
X1001	1-577-667-11	CRYSTA. OSC (4.43MHz)	
X1002	1-579-082-11	CRYSTAL (3.579545KHz)	
X1003	1-579-595-11	CRYSTAL, OSC (8.92946MHz)	

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
XF101	1-236-897-11	LC PACK	
XF301	1-579-593-11	CRYSTAL, OSC (12MHz)	

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POWER UNIT TB-1

Ref. No.	Part No.	Description			Remark
		POWER UNIT BOARD, COMPLETE **************************			
		< CAPACITOR >			
⚠C5001	1-130-679-21	FILM	0.068uF	20%	250V
⚠C5002	1-130-679-21	FILM	0.068uF	20%	250V
C5003	1-128-529-11	CAP, ELECT	82uF 400V		
C5004	1-123-944-11	ELECT	2.2uF		250V
C5005	1-165-113-11	CAP, CERAMIC	100PF 1K		
C5006	1-124-514-11	ELECT	100uF	20%	50V
C5007	1-123-358-11	ELECT	33uF	20%	35V
C5008	1-124-464-11	ELECT	0.22uF		50V
C5009	1-130-469-11	CAP, PE	680PF		50V
C5010	1-161-021-11	CERAMIC	0.047uF	10%	25V
C5011	1-161-021-11	CERAMIC	0.047uF	10%	25V
C5012	1-126-301-11	ELECT	1uF	20%	50V
⚠C5020	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C5021	1-161-741-00	CERAMIC	0.001uF	10%	400V
C5101	1-126-234-11	ELECT	2200uF	20%	16V
C5102	1-126-103-11	ELECT	470uF	20%	16V
C5103	1-124-525-11	ELECT	1000uF	20%	25V
C5104	1-126-103-11	ELECT	470uF	20%	16V
C5105	1-124-910-11	ELECT	47uF	20%	50V
C5106	1-124-910-11	ELECT	47uF	20%	50V
C5107	1-126-103-11	ELECT	470uF	20%	16V
C5108	1-162-286-11	CERAMIC	220PF		
C5109	1-136-165-00	FILM	0.1uF	5%	50V
C5110	1-165-179-11	CAP, CERAMIC	1000PF 500V		
C5111	1-165-179-11	CERAMIC	1000PF		500V
C5201	1-161-047-00	CERAMIC	0.0047uF	10%	50V
C5202	1-124-910-11	ELECT	47uF	20%	50V
		< DIODE >			
D5001	1-809-505-11	DIODE	S1WBA60		
D5002	8-719-921-44	DIODE	MTZJ-5.1C		
D5003	1-808-898-11	DIODE	AP01C-V0		
D5004	1-808-899-11	DIODE	AG01-V2		
D5005	1-808-899-11	DIODE	AG01-V2		
D5006	8-719-110-49	DIODE	RD18ES-B2		
D5007	8-719-983-27	DIODE	MTZJ-T-77-30A		
D5008	1-809-070-11	DIODE	AK04-V2		
⚠D5011	- - -	DIODE	PC120FB		
D5101	1-809-686-11	DIODE	RL4ZLF-M1		
D5102	8-719-981-00	DIODE	ERC81-004		
D5103	1-808-899-11	DIODE	AG01-V2		
D5104	1-808-899-11	DIODE	AG01-V2		
D5105	8-719-901-83	DIODE	1SS83		
D5106	8-719-901-83	DIODE	1SS83		
D5201	8-719-901-83	DIODE	1SS83		

Ref. No.	Part No.	Description				Remark
		< FUSE >				
⚠F5001	1-532-203-00	FUSE, TIME-LAG T2A 250V				
		< IC >				
IC511	8-759-820-97	IC L5431				
IC521	1-808-795-11	IC SI3120CA				
		< COIL >				
⚠L5002	1-424-575-11	COIL, LINE FILTER				
L5101	1-543-699-11	CORE				
L5102	1-412-464-11	INDUCTOR, COIL 10uH				
		< ICP >				
PR511	1-576-115-11	ICP-F25				
		< TRANSISTOR >				
Q5001	1-809-502-11	TRANSISTOR 2SK1460-YA				
		< RESISTOR >				
⚠R5001	1-202-724-00	SOLID	2.7M	10%	1/2W	
⚠R5002	1-219-126-11	RES	2.2		2W	
R5005	1-220-402-11	METAL OXIDE	68K	5%	1W	F
R5008	1-216-341-11	METAL OXIDE	0.22	5%	1W	F
R5105	9-910-999-31	METAL	1.6K	1%	1/4W	
R5106	9-910-999-31	METAL	1.6K	1%	1/4W	
		< TRANSFORMER >				
⚠T5001	1-692-169-11	TRANSFORMER POWER				
		< FUSE HOLDER >				
Y5104	1-533-258-11	HOLDER, FUSE				
Y5105	1-533-258-11	HOLDER, FUSE				

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*	A-6756-448-A	TB-1 BOARD, COMPLETE *********************				
		< SWITCH >				
S8501	1-692-106-11	SWITCH, SLIDE (TV SYSTEM)				

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Ref. No.	Part No.	Description	Remark
*	A-6756-455-A	TM-1 BOARD, COMPLETE *********************	
*	3-947-398-01	HOLDER	
*	3-947-424-01	HOLDER, LED	
*	3-947-425-01	HOLDER, LED	
		< INDICATOR TUBE >	
A7101	1-519-739-11	INDICATOR TUBE, FLUORESCENT	
		< BUZZER >	
BZ711	1-529-113-11	BUZZER, PIEZO CB13PA-X5	
		< CAPACITOR >	
C7102	1-162-207-11	CERAMIC 22PF 5% 50V	
C7103	1-102-958-00	CERAMIC 20PF 5% 50V	
C7104	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C7105	1-126-157-11	ELECT 10uF 20% 16V	
C7106	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C7107	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C7108	1-126-157-11	ELECT 10uF 20% 16V	
C7109	1-161-063-00	CERAMIC 0.1uF 10% 50V	
C7110	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C7111	1-124-234-00	ELECT 22uF 20% 16V	
C7112	1-162-286-11	CERAMIC 220PF 50V	
C7121	1-136-956-11	ELECT 0.047uF 5.5V	
		< CONNECTOR >	
CN714	1-691-859-11	PLUG 18P	
CN715	1-580-850-11	CONNECTOR (DMS) 8P	
		< DIODE >	
D7101	8-719-912-20	DIODE 1SS120	
D7102	8-719-912-20	DIODE 1SS120	
D7103	8-719-912-20	DIODE 1SS120	
D7104	8-719-912-20	DIODE 1SS120	
D7105	8-719-912-20	DIODE 1SS120	
D7106	8-719-912-20	DIODE 1SS120	
D7107	8-719-912-20	DIODE 1SS120	
D7109	8-719-912-20	DIODE 1SS120	
D7117	8-719-912-20	DIODE 1SS120	
D7119	8-719-912-20	DIODE 1SS120	
D7120	8-719-912-20	DIODE 1SS120	
D7124	1-809-687-11	LED SEL2410G-D	
D7125	1-809-687-11	LED SEL2410G-D	
D7126	1-809-687-11	LED SEL2410G-D	
D7127	1-809-687-11	LED SEL2410G-D	
D7128	1-809-687-11	LED SEL2410G-D	
D7129	1-809-687-11	LED SEL2410G-D	
D7130	1-809-687-11	LED SEL2410G-D	
D7131	1-809-687-11	LED SEL2410G-D	
D7132	1-809-687-11	LED SEL2410G-D	
		< IC >	
IC711	1-809-677-11	IC M38102M4-602SP	
IC712	8-759-403-39	IC MN1280-L	
IC713	1-809-676-11	IC ST24C01B1	
		< TRANSISTOR >	
Q7101	8-729-206-31	TRANSISTOR RN2202	
Q7102	8-729-206-20	TRANSISTOR RN1202	
		< RESISTOR >	
R7101	1-202-731-00	SOLID 10M 10% 1/2W	
		< UNIT BACK >	
RR711	1-466-717-11	BACK UNIT, IR RECEIVER	
		< SWITCH >	
S7105	1-692-104-11	SWITCH, PUSH (INSTANT REPLAY)	
S7106	1-692-104-11	SWITCH, PUSH (PAUSE)	
S7107	1-692-104-11	SWITCH, PUSH (REC)	
S7109	1-692-104-11	SWITCH, PUSH (TIMER)	
S7110	1-692-104-11	SWITCH, PUSH (QSR)	
S7111	1-692-104-11	SWITCH, PUSH (TAPE SPEED)	
S7113	1-692-104-11	SWITCH, PUSH (CH UP)	
S7114	1-692-104-11	SWITCH, PUSH (CH DOWN)	
S7116	1-692-104-11	SWITCH, PUSH (INPUT SELECT)	
S7121	1-692-104-11	SWITCH, PUSH (A.C)	
S7122	1-572-662-11	SWITCH, ROTARY	
		< TEST PIN >	
TP711	1-569-073-11	PLUG 4P	
		< VIBRATOR >	
X7101	1-579-566-11	RESONATOR, CERAMIC 4.0MH	
X7102	1-579-220-11	CRYSTAL, OSC (32KHZ)	

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TM-2 TM-3 TM-5

Ref. No.	Part No.	Description	Remark
*	A-6756-456-A	TM-2 BOARD, COMPLETE *********************	
		< CONNECTOR >	
CN721	1-691-860-11	SOCKET 18P	
CN722	1-691-857-11	PLUG 4P	
		< DIODE >	
D7221	8-719-912-20	DIODE 1SS120	
D7222	8-719-912-20	DIODE 1SS120	
D7223	8-719-912-20	DIODE 1SS120	
		< TRANSISTOR >	
Q7203	8-729-206-31	TRANSISTOR RN2202	
Q7204	8-729-206-31	TRANSISTOR RN2202	
		< SWITCH >	
S7204	1-692-104-11	SWITCH, PUSH (EJECT)	
S7217	1-692-104-11	SWITCH, PUSH (TR +)	
S7218	1-692-104-11	SWITCH, PUSH (TR -)	
S7219	1-692-104-11	SWITCH, PUSH (ATR)	
S7223	1-692-105-11	SWITCH, SLIDE 2-4 NS (COLOR SYSTEM)	
S7224	1-692-107-11	SWITCH, SLIDE 2-2 (NAP)	
S7225	1-692-107-11	SWITCH, SLIDE 2-2 (RTL.PICT)	
		< VARIABLE RESISTOR >	
VR721	1-241-889-11	VR, ROTARY 3KB (PICTURE)	
**			
*	A-6756-457-A	TM-3 BOARD, COMPLETE *********************	
	3-943-546-01	HOLDER, LED	
		< CONNECTOR >	
CN731	1-691-858-11	SOCKET 4P	
		< DIODE >	
D7333	1-809-516-11	LED MPG3868S-J85K-E (POWER)	
D7334	1-809-516-11	LED MPG3868S-J85K-E (POWER)	
		< SWITCH >	
S7303	1-692-104-11	SWITCH, PUSH (POWER)	
**			

Ref. No.	Part No.	Description	Remark
*	A-6756-450-A	TM-5 BOARD, COMPLETE *********************	
		< CAPACITOR >	
C7501	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C7502	1-126-155-11	ELECT 100uF 20% 6.3V	
C7503	1-126-162-11	ELECT 3.3uF 20% 50V	
C7504	1-162-211-31	CERAMIC 33PF 5% 50V	
C7505	1-162-211-31	CERAMIC 33PF 5% 50V	
C7506	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C7507	1-136-173-11	CERAMIC CHIP 0.47uF 10% 25V	
C7508	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C7509	1-101-880-00	CERAMIC 47PF 5% 50V	
C7510	1-101-880-00	CERAMIC 47PF 5% 50V	
C7511	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C7512	1-162-211-31	CERAMIC 33PF 5% 50V	
C7513	1-163-093-00	CERAMIC CHIP 10PF 5% 50V	
C7514	1-162-201-31	CERAMIC 12PF 5% 50V	
C7515	1-126-162-11	ELECT 3.3uF 20% 50V	
C7516	1-162-211-31	CERAMIC 33PF 5% 50V	
		< DIODE >	
D7501	8-719-400-18	DIODE MA152WK	
		< IC >	
IC751	1-809-675-11	IC M50554-281SP	
		< COIL >	
L7502	1-410-511-11	INDUCTOR 15uH	
L7503	1-410-513-11	INDUCTOR 22uH	
L7504	1-410-515-11	INDUCTOR 33uH	
L7505	1-410-515-11	INDUCTOR 33uH	
		< TRANSISTOR >	
Q7501	8-729-805-41	TRANSISTOR 2SC3398	
Q7502	8-729-805-41	TRANSISTOR 2SC3398	
Q7503	8-729-216-22	TRANSISTOR 2SA1162-G	
Q7504	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q7505	8-729-230-49	TRANSISTOR 2SC2712-YG	
		< RESISTOR >	
R7501	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R7502	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R7503	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R7504	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R7505	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R7506	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R7507	1-216-653-11	METAL CHIP 1.2K 0.5% 1/10W	

Ref. No.	Part No.	Description			Remark
R7508	1-216-049-00	METAL CHIP	1K	5%	1/10W
R7509	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R7510	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R7511	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R7512	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R7513	1-216-333-11	METAL CHIP	15K	1%	1/10W
R7514	1-216-041-00	METAL CHIP	470	5%	1/10W
R7515	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R7516	1-216-085-00	METAL CHIP	33K	5%	1/10W
R7517	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R7518	1-216-085-00	METAL CHIP	33K	5%	1/10W
R7519	1-216-073-00	METAL CHIP	10K	5%	1/10W
R7520	1-216-073-00	METAL CHIP	10K	5%	1/10W
		< VIBRATOR >			
X7501	1-579-592-11	CRYSTAL, OSC (17.734475MHz)			

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* A-6756-451-A TM-9 BOARD, COMPLETE

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Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C7901	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C7902	1-126-155-11	ELECT	100uF	20%	6.3V
C7903	1-126-162-11	ELECT	3.3uF	20%	50V
C7904	1-162-211-31	CERAMIC	33PF	5%	50V
C7905	1-162-211-31	CERAMIC	33PF	5%	50V
C7906	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C7907	1-136-173-11	CERAMIC CHIP	0.47uF	10%	25V
C7908	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C7910	1-101-880-00	CERAMIC	47PF	5%	50V
C7911	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C7912	1-162-211-31	CERAMIC	33PF	5%	50V
C7913	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C7914	1-162-201-31	CERAMIC	12PF	5%	50V
C7915	1-126-162-11	ELECT	3.3uF	20%	50V
		< IC >			
IC791	1-809-675-11	IC M50554-281SP			
		< COIL >			
L7902	1-410-511-11	INDUCTOR 15uH			
L7903	1-410-513-11	INDUCTOR 22uH			
L7904	1-410-515-11	INDUCTOR 33uH			
		< TRANSISTOR >			
Q7901	8-729-805-41	TRANSISTOR 2SC3398			
Q7902	8-729-805-41	TRANSISTOR 2SC3398			
Q7903	8-729-216-22	TRANSISTOR 2SA1162-G			
Q7904	8-729-230-49	TRANSISTOR 2SC2712-YG			
		< RESISTOR >			
R7901	1-216-073-00	METAL CHIP	10K	5%	1/10W
R7902	1-216-073-00	METAL CHIP	10K	5%	1/10W
R7903	1-216-073-00	METAL CHIP	10K	5%	1/10W
R7904	1-216-049-00	METAL CHIP	1K	5%	1/10W
R7905	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R7906	1-216-049-00	METAL CHIP	1K	5%	1/10W
R7907	1-216-653-11	METAL CHIP	1.2K	0.5%	1/10W
R7908	1-216-049-00	METAL CHIP	1K	5%	1/10W
R7909	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R7910	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R7911	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R7912	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R7913	1-216-542-11	METAL CHIP	12K	1%	1/10W
R7914	1-216-041-00	METAL CHIP	470	5%	1/10W
R7915	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R7916	1-216-085-00	METAL CHIP	33K	5%	1/10W
R7917	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R7918	1-216-085-00	METAL CHIP	33K	5%	1/10W
		< VIBRATOR >			
X7901	1-579-591-11	CRYSTAL, OSC (14.31818MHz)			

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A-6756-225-A TN-7 BOARD, COMPLETE

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Ref. No.	Part No.	Description			Remark
		< TRANSISTOR >			
B6901	8-729-805-45	TRANSISTOR 2SC3395			
		< CAPACITOR >			
C6901	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C6902	1-164-004-11	ELECT	10uF	10%	16V
C6903	1-163-063-00	CERAMIC CHIP	0.022uF	10%	50V
C6904	- - - -	ELECT	0.22uF		50V
C6921	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C6922	1-164-076-11	CERAMIC	180PF	10%	50V
C6923	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C6924	1-136-502-11	MYLAR	0.33uF	5%	50V
C6925	1-130-499-00	MYLAR	0.22uF	5%	50V
		< DIODE >			
D6901	8-719-400-18	DIODE MA152WK			
D6902	8-719-800-76	DIODE 1SS226			
		< IC >			
IC691	8-759-800-65	IC LA7910			

TN-7 VD-1 VD-2

Ref. No.	Part No.	Description			Remark
		< TRANSISTOR >			
Q6901	8-729-881-21	TRANSISTOR 2SC2812-L5			
Q6902	8-729-119-48	TRANSISTOR 2SA1464-Y13			
Q6903	8-729-881-21	TRANSISTOR 2SC2812-L5			
Q6921	8-729-345-85	TRANSISTOR 2SC458K			
		< RESISTOR >			
R6901	1-216-049-00	METAL CHIP	1K	5%	1/10W
R6902	1-216-037-00	METAL CHIP	330	5%	1/10W
R6903	1-216-646-11	METAL CHIP	620	0.5%	1/10W
R6904	1-216-073-00	METAL CHIP	10K	5%	1/10W
R6905	1-216-109-00	METAL CHIP	330K	5%	1/10W
R6906	1-216-073-00	METAL CHIP	10K	5%	1/10W
R6907	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R6908	1-216-625-11	METAL CHIP	82	0.5%	1/10W
R6909	1-216-049-00	METAL CHIP	1K	5%	1/10W
R6910	1-218-143-11	METAL GLAZE	510	1%	1/10W
R6911	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R6912	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R6921	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R6922	1-216-085-00	METAL CHIP	33K	5%	1/10W
R6923	1-216-073-00	METAL CHIP	10K	5%	1/10W
R6924	1-216-073-00	METAL CHIP	10K	5%	1/10W
R6925	1-216-079-00	METAL CHIP	18K	5%	1/10W
R6926	1-216-333-11	METAL CHIP	15K	1%	1/10W
R6927	1-216-542-11	METAL CHIP	12K	1%	1/10W
		< TRANSFORMER >			
T6901	1-426-511-11	TRANSFORMER, IF			

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* A-6756-452-A VD-1 BOARD, COMPLETE

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		< TRANSISTOR >			
B1701	8-729-805-41	TRANSISTOR 2SC3398			
		< CAPACITOR >			
C1701	1-102-129-00	CERAMIC	10000PF	10%	50V
C1702	1-162-282-31	CERAMIC	100PF	10%	50V
C1703	1-126-157-11	ELECT	10uF	20%	16V
C1704	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C1705	1-126-157-11	ELECT	10uF	20%	16V
C1706	1-102-129-00	CERAMIC	10000PF	10%	50V
		< IC >			
IC171	8-759-996-63	IC BA7025L			

Ref. No.	Part No.	Description			Remark
		< TRANSISTOR >			
Q1701	8-729-101-25	TRANSISTOR 2SC1009A-FA4			
		< RESISTOR >			
R1701	1-216-073-00	METAL CHIP	10K	5%	1/10W
R1702	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R1703	1-216-653-11	METAL CHIP	1.2K	0.5%	1/10W
R1704	1-216-049-00	METAL CHIP	1K	5%	1/10W
R1705	1-216-081-00	METAL CHIP	22K	5%	1/10W
R1706	1-216-049-00	METAL CHIP	1K	5%	1/10W
R1707	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R1708	1-216-101-00	METAL CHIP	150K	5%	1/10W
R1709	1-216-040-00	METAL GLAZE	430	5%	1/10W
R1710	1-216-081-00	METAL CHIP	22K	5%	1/10W
R1711	1-216-073-00	METAL CHIP	10K	5%	1/10W
		< VIBRATOR >			
XF171	1-236-633-11	FILTER			
XF172	1-433-396-11	TRANSFORMER, OSCILLATION			

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* A-6756-454-A VD-2 BOARD, COMPLETE

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		< CAPACITOR >			
C1501	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1502	1-162-282-31	CERAMIC	100PF	10%	50V
C1503	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1504	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1505	1-161-494-00	CERAMIC	0.022uF		25V
C1506	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1507	1-164-068-11	CERAMIC	82PF	5%	50V
C1508	1-130-475-00	MYLAR	0.0022uF	5%	50V
C1509	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1510	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1511	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1512	1-162-282-31	CERAMIC	100PF	10%	50V
C1513	1-126-154-11	ELECT	47uF	20%	6.3V
C1514	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1515	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1516	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1517	1-162-282-31	CERAMIC	100PF	10%	50V
C1518	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1519	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1520	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1521	1-162-201-31	CERAMIC	12PF	5%	50V
C1522	1-162-280-31	CERAMIC	82PF	10%	50V
C1523	1-162-284-31	CERAMIC	150PF	10%	50V

Ref. No.	Part No.	Description			Remark
C1524	1-162-197-31	CERAMIC	6.8PF	10%	50V
C1525	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1526	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1527	1-126-157-11	ELECT	10uF	20%	16V
C1528	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1529	1-126-157-11	ELECT	10uF	20%	16V
C1530	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1531	1-126-154-11	ELECT	47uF	20%	6.3V
C1532	1-164-064-11	CERAMIC	56PF	5%	50V
C1533	1-161-379-00	CERAMIC	0.01uF	20%	25V
		< DIODE >			
D1502	8-719-912-20	DIODE 1SS120			
		< IC >			
IC151	1-809-314-11	IC BA7107S			
		< COIL >			
L1501	1-410-525-11	INDUCTOR 220uH			
L1502	1-410-521-11	INDUCTOR 100uH			
L1503	1-410-335-11	INDUCTOR 150uH			
L1504	1-410-522-11	INDUCTOR 120uH			
L1505	1-410-520-11	INDUCTOR 82uF			
		< TRANSISTOR >			
Q1501	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q1502	8-729-900-80	TRANSISTOR	DTC114ES		
Q1503	8-729-119-76	TRANSISTOR	2SA1175-HFE		
Q1504	8-729-119-76	TRANSISTOR	2SA1175-HFE		
Q1505	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q1506	8-729-119-78	TRANSISTOR	2SC2785-HFE.		
Q1507	8-729-201-53	TRANSISTOR	2SA1015-GR		
Q1508	8-729-900-89	TRANSISTOR	DTC144ES		
		< VARIABLE RESISTOR >			
VR131	1-228-995-00	RES, ADJ, METAL 22K			
VR183	1-228-990-00	RES, ADJ, METAL 1K			
		< VIBRATOR >			
XF151	1-239-071-11	FILTER 1.6M LPF 4.4MBPF			
XF152	1-239-072-11	FILTER 4.4M B.P.F			
XF153	1-409-485-11	TRAP 4.286M BELL			
XF154	1-409-486-11	TRAP 1.0715 BELL			

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Ref. No.	Part No.	Description			Remark
*	A-6756-453-A	VP-1 BOARD, COMPLETE			
		********************			
		< CAPACITOR >			
C1901	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1902	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1903	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1904	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1905	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1906	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1907	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1908	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1909	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1910	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1911	1-124-252-00	ELECT	0.33uF	20%	50V
C1912	1-126-163-11	ELECT	4.7uF	20%	25V
C1913	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1951	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1952	1-162-212-11	CERAMIC	36PF	5%	50V
C1953	1-164-060-11	CERAMIC	39PF	5%	50V
C1954	1-162-197-11	CERAMIC	6.8PF	10%	50V
C1955	1-162-210-11	CERAMIC	30PF	5%	50V
C1956	1-101-880-00	CERAMIC	47PF	5%	50V
C1957	1-164-064-11	CERAMIC	68PF	5%	50V
C1959	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1960	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1961	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1962	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1963	1-126-154-11	ELECT	47uF	20%	6.3V
C1964	1-161-379-00	CERAMIC	0.01uF	10%	50V
C1965	1-161-379-00	CERAMIC	0.01uF	20%	25V
		< DIODE >			
D1901	8-719-912-20	DIODE 1SS120			
		< IC >			
IC191	1-809-673-11	IC LA7374			
		< COIL >			
L1901	1-410-521-11	INDUCTOR 100uH			
L1951	1-410-507-11	INDUCTOR 6.8uH			
L1952	1-410-518-41	INDUCTOR 56uH			
L1953	1-410-511-11	INDUCTOR 15uH			
L1954	1-410-511-11	INDUCTOR 15uH			
		< TRANSISTOR >			
Q1951	8-729-900-89	TRANSISTOR DTC144ES			
Q1952	8-729-266-83	TRANSISTOR 2SC2668-Y			

Ref. No.	Part No.	Description	Remark
Q1953	8-729-266-83	TRANSISTOR 2SC2668-Y	
Q1954	8-729-266-83	TRANSISTOR 2SC2668-Y	
Q1956	8-729-119-78	TRANSISTOR 2SC2785-HFE	

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MISCELLANEOUS
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Ref. No.	Part No.	Description	Remark
13	1-694-007-11	TERMINAL	
22	1-466-718-11	MODULATOR, RF	
23	1-466-522-11	IF PACK	
24	1-465-748-11	TUNER PACK	
105	1-808-710-11	PHOTO TRANSISTORPN150SAN	
159	1-808-722-11	DIODE LN59 (RED)	
239	1-572-383-11	SWITCH, ROTARY	
* 289	1-461-017-11	ROTOR	
299	1-462-284-11	STATOR	
341-1	1-571-931-11	SWITCH, LEAF (FRONT LOADING) (MC-1)	
341-2	1-571-932-11	SWITCH, LEAF (ERASURE-PREVENSION) (MC-1)	
341-3	1-808-723-11	PHOTO COUPLER (T REEL SENSOR) (MC-1)	

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ACCESSORIES & PACKING MATERIALS
****

Ref. No.	Part No.	Description	Remark
	1-569-008-11	ADAPTER, CONVERSION 2P (SLV-X700)	
⚠	1-590-224-11	CORD, POWER	
	1-693-152-11	REMOTE CONTRPL (RMT-V121)	
	3-749-104-01	CABLE, ANT	
	3-754-806-41	MANUAL, INSTRUCTION (ENGLISH, SPANISH, CHAINESE, ARABIC)	
	3-755-279-41	MANUAL, INSTRUCTION (ENGLISH, GERMAN, RUSSIAN, POLISH)	
	3-943-535-01	COVER, BATTERY	
*	3-947-421-01	CUSHION, INNER	
*	3-947-422-01	CUSHION, INNER	
*	3-947-429-01	INDIVIDUAL CARTON (SLV-X700)	
*	3-949-132-01	INDIVIDUAL CARTON (SLV-526MK)	

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****
HARDWARE LIST
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Ref. No.	Part No.	Description
#1	7-685-647-79	SCREW +BTP 3X10 TYPE2 N-S
#2	7-685-645-79	SCREW +BTP 3X6 TYPE2 N-S
#3	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S
#4	7-621-759-45	+PSW, 2.6X6
#5	7-685-131-19	SCREW +BTP 2.6X4 TYPE2 N-S
#6	7-624-105-04	STOP RING 2.3, TYPE -E
#7	7-685-648-79	SCREW +BVTP 3X12 TYPE2 IT-3
#8	7-621-775-20	SCREW +B 2.6X5
#9	7-685-646-79	SCREW +BTP 3X8 TYPE 2 N-S
#10	7-682-648-09	SCREW (3X8), +PW
#13	7-628-253-20	SCREW (2.3X6), +PSW

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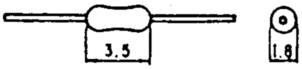
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Description

	5%	1/4W	A
CARBON RESISTOR	5%	1/4W	



Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.
0.22Ω		11Ω	1-247-784-00	200Ω	1-247-814-11	3.6kΩ	1-247-844-11	62kΩ	1-247-874-11	1.2MΩ	
0.27Ω		12Ω	1-249-394-11	220Ω	1-249-409-11	3.9kΩ	1-249-424-11	68kΩ	1-249-439-11	1.5MΩ	
0.33Ω		13Ω	1-247-786-11	240Ω	1-247-816-11	4.3kΩ	1-247-846-11	75kΩ	1-247-876-11	1.8MΩ	
0.39Ω		15Ω	1-249-395-11	270Ω	1-249-410-11	4.7kΩ	1-249-425-11	82kΩ	1-249-440-11	2.0MΩ	
0.47Ω	1-249-377-11	16Ω	1-247-788-00	300Ω	1-247-818-11	5.1kΩ	1-247-848-11	91kΩ	1-247-878-00	2.2MΩ	1-259-880-11
0.56Ω	1-249-378-11	18Ω	1-249-396-11	330Ω	1-249-411-11	5.6kΩ	1-249-426-11	100kΩ	1-249-441-11	2.7MΩ	
0.68Ω	1-249-379-11	20Ω	1-247-790-11	360Ω	1-247-820-11	6.2kΩ	1-247-850-11	110kΩ	1-247-880-11	3.3MΩ	
0.82Ω	1-249-380-11	22Ω	1-249-397-11	390Ω	1-249-412-11	6.8kΩ	1-249-427-11	120kΩ	1-247-881-00	3.9MΩ	
1.0Ω	1-249-381-11	24Ω	1-247-792-11	430Ω	1-247-822-11	7.5kΩ	1-247-852-11	130kΩ	1-247-882-11	4.7MΩ	
1.2Ω	1-249-382-11	27Ω	1-249-398-11	470Ω	1-249-413-11	8.2kΩ	1-249-428-11	150kΩ	1-247-883-00	5.6MΩ	
1.5Ω	1-249-383-11	30Ω	1-247-794-11	510Ω	1-249-442-11	9.1kΩ	1-247-854-11	160kΩ	1-247-884-11	6.8MΩ	
1.6Ω		33Ω	1-249-399-11	560Ω	1-249-414-11	10kΩ	1-249-429-11	180kΩ	1-247-885-00	8.2MΩ	
1.8Ω	1-249-384-11	36Ω	1-247-796-11	620Ω	1-247-826-00	11kΩ	1-247-856-00	200kΩ	1-247-886-11	10MΩ	
2.2Ω	1-249-385-11	39Ω	1-249-400-11	680Ω	1-249-415-11	12kΩ	1-249-430-11	220kΩ	1-247-887-00	12MΩ	
2.4Ω	1-247-768-00	43Ω	1-247-798-11	750Ω	1-247-828-11	13kΩ	1-247-858-11	240kΩ	1-247-888-11	15MΩ	
2.7Ω	1-249-386-11	47Ω	1-249-401-11	820Ω	1-249-416-11	15kΩ	1-249-431-11	270kΩ	1-247-889-00	18MΩ	
3.0Ω	1-247-770-00	51Ω	1-247-800-11	910Ω	1-247-830-11	16kΩ	1-247-860-11	300kΩ	1-247-890-11	22MΩ	
3.3Ω	1-249-387-11	56Ω	1-249-402-11	1.0kΩ	1-249-417-11	18kΩ	1-249-432-11	330kΩ	1-247-891-00		
3.6Ω	1-247-772-00	62Ω	1-247-802-11	1.1kΩ	1-247-832-11	20kΩ	1-247-862-11	360kΩ	1-247-892-11		
3.9Ω	1-249-388-11	68Ω	1-249-403-11	1.2kΩ	1-249-418-11	22kΩ	1-249-433-11	390kΩ	1-247-893-11		
4.3Ω	1-247-774-00	75Ω	1-247-804-11	1.3kΩ	1-247-834-11	24kΩ	1-247-864-11	430kΩ	1-247-894-11		
4.7Ω	1-249-389-11	82Ω	1-249-404-00	1.5kΩ	1-249-419-11	27kΩ	1-249-434-11	470kΩ	1-247-895-00		
5.1Ω	1-247-776-00	91Ω	1-247-806-11	1.6kΩ	1-247-836-11	30kΩ	1-247-866-11	510kΩ	1-247-896-11		
5.6Ω	1-249-390-11	100Ω	1-249-405-11	1.8kΩ	1-249-420-11	33kΩ	1-249-435-11	560kΩ	1-247-897-11		
6.2Ω	1-247-778-00	110Ω	1-247-808-11	2.0kΩ	1-247-838-00	36kΩ	1-247-868-11	620kΩ	1-247-898-11		
6.8Ω	1-249-391-11	120Ω	1-249-406-11	2.2kΩ	1-249-421-11	39kΩ	1-249-436-11	680kΩ	1-247-899-11		
7.5Ω	1-247-780-00	130Ω	1-247-810-11	2.4kΩ	1-247-840-00	43kΩ	1-247-870-11	750kΩ	1-247-900-11		
8.2Ω	1-249-392-11	150Ω	1-249-407-11	2.7kΩ	1-249-422-11	47kΩ	1-249-437-11	820kΩ	1-247-901-11		
9.1Ω	1-247-782-00	160Ω	1-247-812-11	3.0kΩ	1-247-842-11	51kΩ	1-247-872-11	910kΩ	1-247-902-11		
10Ω	1-249-393-11	180Ω	1-249-408-11	3.3kΩ	1-249-423-11	56kΩ	1-249-438-11	1.0MΩ	1-247-903-00		

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